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# ADDRESSES AND ORIGINAL ARTICLES

## ON VACCINE THERAPY AND IMMUNISATION IN VITRO.

BY SIR ALMROTH WRIGHT, K.B.E., C.B., M.D., D.Sc. DUB., F.R.S.,

PRINCIPAL OF THE INSTITUTE OF PATHOLOGY AND RESEARCH, ST. MARY'S HOSPITAL; PROFESSOR OF EXPERIMENTAL PATHOLOGY IN THE UNIVERSITY OF LONDON.

(*Concluded from p. 284.*)

### Specific and Non-specific Immunity.

IT has already been indicated above that the terms "specific" and "non-specific" are terms of ambiguous signification. Let me justify this.

When we speak of "specific" immunising response, we may mean that infection or its equivalent—i.e., the inoculation of a vaccine—renders the blood bactericidal to the homologous microbes, and only to these; and when we attach this meaning to "specific immunising response" we should, of course, mean by "non-specific immunising response" the acquirement of bactericidal properties for heterologous, as well as homologous microbes.

We may, however, when we use the terms "specific" and "non-specific" be thinking not of the question as to whether immunising response gives protection against one or more varieties of microbes, but of the question as to whether the antibacterial substances brought into play operate "specifically"—each affecting only one species of microbe, or whether they operate "non-specifically"—each affecting more than one species.

Having realised that the terms "specific" and "non-specific" are terms which carry these two distinct meanings, it will avoid confusion if we call the thesis that infection and vaccination immunise only against homologous microbes: "*the doctrine of purely homologous immunising response*," and the antithetic thesis that protection is acquired also against heterologous microbes: "*the doctrine of conjointly homologous and heterologous immunising response.*" Similarly, we should do well to call the thesis that there are special antibacterial substances for each kind of microbe: "*the doctrine of specific antibodies*"; and the antithetic thesis that there are antibacterial substances which operate upon more than one kind of microbe: "*the doctrine of non-specific antibodies.*"

#### IS THE IMMUNISING RESPONSE SPECIFIC?

Having clarified the issues we may now make inquiry from the facts, first, as to whether immunising response is specific or non-specific, and secondly, as to whether the antibodies which are native to the blood or are engendered there by infection and vaccination, are specific or non-specific. The answer to the former question is given in many of the protocols of immunisation in vitro already adduced or to be adduced later, as well as in numerous others published and unpublished. A study of the protocols referred to shows that Tuberculin B.E. gives immunising response upon staphylococcus; that staphylococcus vaccine gives immunising response upon streptococcus, and typhoid vaccine operates in the same way upon staphylococcus. Further, it would seem—at any rate in the case of my own blood—that better immunising response is obtained upon staphylococcus with Tuberculin B.E. than with staphylococcus vaccine.

I shall presently have something to say with respect to this last finding.

When we pass from immunising operations in vitro to immunising operations in vivo we again find clear evidence of "non-specific"—i.e., heterologous response. Fig. 4 gives a very convincing example of response obtained upon staphylococcus by an intravenous inoculation of a coliform vaccine. We have here first a negative phase of diminished and then a positive phase of increased hæmobactericidal action exerted upon the staphylococcus.

And let me, in this connexion, call attention to two points. The first is a question of terminology. It relates to the fact that severe and rapidly supervening constitutional symptoms, such as follow intravenous inoculation, and followed it here, are in the current jargon of medicine, designated "protein shock." This terminology is to be deprecated because there attach to this term quite erroneous implications. (1) The term suggests that in the case where vaccines produce protein shock this is produced by active agents other than those which produce ordinary immunising response. (2) The term further suggests—for it is employed only in connexion with intravenous injections—that protein shock is produced only by intravenous inoculations. Those who have administered large doses of typhoid vaccine hypodermically, and have witnessed the resulting supervention of shock in patients, and in particular in patients who have immediately after inoculation engaged in active exercise, will not require to be told that shock can follow when a severely toxic dose of a vaccine given by the subcutaneous channel has been carried into the circulating blood. Another vice of the term "protein shock" lies in its assimilating intravenous inoculations of vaccine to intravenous inoculations of milk, foreign serum, and such like, in lieu of assimilating these injections of foreign albuminous substances to inoculations of vaccine. And an even more serious vice is that the term "protein shock" carries with it the suggestion that non-specific immunising response is a product peculiar to intravenous injections of foreign proteins when it is, in point of fact, a general property of vaccines.

A final point to which I want to draw attention relates to the leucocytic counts inserted at the foot of Fig. 4. These figures illustrate the point that inoculations of vaccine, and in particular, severe inoculations, such as that here in question, are followed by a phase of leucopenia, followed by a phase of leucocytosis; and the figures are inserted here to bring out the point that the increased bactericidal effect shown in the fourth compartment of the slide cell is achieved quite independently of any leucocytosis.

Immunising response in vivo is, I need now hardly say, not confined to the case of coliform vaccines. We have evidence that streptococcus gives immunising response in vivo upon staphylococcus, and similarly, staphylococcus vaccine upon streptococcus. And these are results obtained by measurements of phagocytic and of sero-bactericidal response—in other words, measurements which cannot be falsified by variations in the number of circulating leucocytes. Let me defer for a moment what I have to say about the importance of these findings for vaccine therapy.

For there can be set off against the protocols of experiments showing non-specific immunising response others which favour the idea that immunising response

is specific. I am thinking here of the experiments set out in Charts 32 and 44 [15] reproduced in my "Studies on Immunisation" (pp. 418 and 425), and I have in view also some unpublished experiments, and among these a peculiarly striking one made by Dr. John Freeman. In the experiments in question (they were, in each case, massage experiments) the patients' bloods were tested to two microbes (in Dr. Freeman's case the blood was tested to five), and immunising response was obtained in each case only to that microbe which was from the clinical and bacteriological evidence adjudged to be causally associated with the patient's malady. But obviously, we have no reason to suppose that every species of microbe can immunise against every other species.

### ARE THE ANTIBODIES SPECIFIC?

The study of the question as to whether the antibodies which are native to the blood and also those engendered by inoculation operate upon one kind of microbe to the exclusion of all others has, for the immunisator, only a subordinate interest. A few points may, however, here be referred to. W. Bulloch and G. T. Western,[16] dealing with antibodies native to the blood, found that the opsonins which operate upon the tubercle bacillus can be removed from the serum without removing the opsonins for staphylococcus and vice versa. They found, further, that the opsonin for staphylococcus can be removed without removing the opsonin for the *Bacillus pyocyaneus*. On the other hand, it has been shown (the data will be found in my "Studies on Immunisation," pp. 50 and 51) that treatment of the serum with dead cultures of typhoid and cholera extracts the bactericidins for both species of microbe.

Let me now supplement the points already brought forward by one more. The work of Shattock and Dudgeon—it was, it will be remembered, carried out with melanin particles—suggested that "phagocytic avidity" was non-specific. This conclusion is confirmed by the observations of my sometime fellow-worker, Dr. R. Hare, dealing with the bloods of cases of puerperal septicæmia. These observations show that increased and diminished phagocytic avidity to streptococcus goes hand in hand with increased and diminished phagocytic avidity to staphylococcus.

### GENERAL CONCLUSIONS.

I should now like to set out the conclusions which seem to me to follow from the data which we have been considering.

Doubtless it seemed paradoxical, and, therefore, doubtful and unacceptable, when I said that when I operate upon my blood with a tubercle vaccine (B.E.) I get better—that is, more emphatic, and for the same dose employed more consistent—immunising response than when I operate with staphylococcus vaccine. In connexion with it I am not going to be rash enough to suggest that the reader should abate anything of his faith in its being a general law of nature for the best immunising response to be obtained by the use of a homologous vaccine. I do not want to do anything more than suggest that a rule such as this might quite well be open to exception. It might be open to a general exception if the heterologous vaccine in question were, as compared with the homologous vaccine, more easily soluble in the blood fluids. And it might be open to an individual exception if a particular patient's blood exerted less lytic action upon a vaccine made with his own microbe than it did upon a vaccine made from a microbe other than the infecting microbe.

Anyone who goes as far as to accept the possibility of such exceptions to rule will be prepared to let the superiority of a vaccine A over a vaccine B—even if the vaccine A should be heterologous and the vaccine B homologous—be decided by laboratory experiment and, moreover, will be prepared to look upon such experiments without parti pris. But while I would plead that the question of superiority of one kind of vaccine over another is one that can be settled only by experiment, none the less I want to put two general points. They are the following:—

In cases where the nature of the infecting agent cannot be determined, advantage very often accrues from inoculation with vaccines made from microbes which are, in all probability, different from those with which the patient is infected. When I say this I have in view (well knowing that these and all other bacteriologically undiagnosed affections are of debatable ætiology) articular rheumatism and phlyctenules of the cornea. It would, I think, be sheer obstinacy to let doubt respecting the ætiology of these affections and a passionate conviction that immunising response is purely specific, hold us back from inoculating in the one case vaccines made from intestinal streptococci, and in the other case minimal doses of Tuberculin B.E. Essentially the same reasoning would, I think, apply in dealing with infections such as glanders, in which homologous vaccines have been tried time and again without success. One might, I think, surmise that such a microbe as that of glanders furnished a very ineffective antigen, and one might, by consequence, reasonably try whether anything useful could be done with a non-homologous vaccine.

### Principles of Dosage.

I turn now—and this will complete what I propose to say here on the subject of vaccine therapy—to the question as to whether we can, with the knowledge gained by the study of immunisation in vitro, add anything to the principles of dosage which were learned when we had only the clinical symptoms and measurements of the opsonic index to guide us. It will be remembered that the most important of the general principles of dosage arrived at by watching and measuring the opsonic index of patients was that the doses of vaccine employed should be inversely as the amount of infection. Further, that, with a view to avoiding negative phases, the doses given to heavily infected patients should be much smaller than those given to the lightly infected, and should represent a very small fraction of the doses administered in prophylactic operations undertaken upon the healthy. This principle finds interesting confirmation when we carry out experiments in vitro. We take a series of equal measured blood volumes and implant into these graduated quanta of living microbes, and then add to each implanted volume one and the same dose of vaccine. It does not require a great effort of imaginative vision to discern that we have here analogous conditions to those which prevail in lightly and heavily infected patients. Instructive illustration of the effects produced is furnished in the subjoined protocols.

*Expt.*—Capillary tubes were prepared with a stem about a foot and a half in length and of almost uniform bore, and a 10 c.mm. division mark was then placed on the distal end

[15] These charts should, however, be studied in conjunction with Charts 7 and 8, pp. 387 and 388, loc. cit.

[16] Proc. Roy. Soc. B, 1906, lxxvii.; reprinted in my Studies on Immunisation, pp. 180–185.

of the stem. Blood was then obtained from my finger, and then there was aspirated into one of the capillary tubes as a forerunner 10 c.mm. of a 1000-fold dilution of a broth culture of staphylococcus; and then, as after runners, ten 10 c.mm. volumes of blood. The same procedure was carried out with two other portions of blood, the one inoculated with a smaller and the other with a larger dose of Tuberculin B.E. After 24 hours' incubation the blood-clots were blown out in order, each series arranged in a row upon a separate strip of filter paper. The clots were then, as soon as they had by absorption of fluid become adherent to the filter paper strips, treated with 1 per cent. saponin, and the strips were then introduced into a beaker full of water, being applied to its interior wall after the fashion of a cornice. When hæmolysis was complete the filter paper strips were placed in a Petri dish containing water, and the decolorised clots were then aspirated into a capillary tube and transferred in proper order to a microscopic slide. They were then dried and stained. The number of colonies which developed in each of the three series of clots is set out in Table XX.

TABLE XX.

| — | No. of colonies of staphylococcus in volumes. | | | | | | | | | | No. of colonies in— | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | The whole 10 vols. | Vols. 1–5 | Vols. 6–10 |
| Control blood .. | 1 | 9 | 5 | 2 | 1 | 2 | 1 | 1 | 0 | 0 | 22 | 18 | 4 |
| Blood inoculated with B.E. 1 in 1000 million .. | 1 | 3 | 4 | 1 | 2 | 0 | 2 | 0 | 0 | 0 | 13 | 11 | 2 |
| Blood inoculated with B.E. 1 in 500 million .. | 4 | 10 | 9 | 15 | 3 | 1 | 0 | 0 | 0 | 0 | 42 | 41 | 1 |

*Note.*—The small number of colonies in Vols. No. 1 is no doubt due to this volume of blood being very highly diluted by the forerunner volume of tuberculin in salt solution.

When we glance, to begin with, at the rubric in which are set down the aggregate number of staphylococcic colonies which developed in the three capillary tubes, we see that the aggregate is, in the case of the blood containing 1 part of B.E. in 1000 million, less by nearly 50 per cent. than it is in the control blood, and that the aggregate number of colonies which developed in the blood which contained 1 part of B.E. in 500 million is nearly double that in the control. If demonstration were necessary of the impossibility of judging a dose of vaccine by the epitomal result produced upon a series of different bloods of patients, such demonstration is furnished here. For, judged by the epitomal effect produced in the whole series of volumes, a dose of 1 part in 500 millions of tuberculin is a large overdose for my blood. Very different are the conclusions which emerge when we analyse the results and consider separately that which applies to the first five and that which applies to the last five volumes of the series. We then see that in the case of the heavily implanted blood volumes the effect of the larger dose of vaccine is to give us in these volumes more than twice as many colonies as in the control blood, and nearly four times as many as in the less heavily vaccinated blood. But when we turn to the effect produced upon the more lightly implanted bloods we see that the larger dose of vaccine enhances the bactericidal power more than does the smaller dose.

An essential similar experiment is Table XXI.

*Expt.* 8.4.31.—Same technique. Forerunner 15 c.mm. volumes of $\frac{\text{staph.}}{1000}$; afterrunners, ten 15 c.mm. volumes of A. E. W.'S blood.

TABLE XXI.

| — | No. of staphylococcus colonies in volumes.* | | | | | | | Whole 8 vols. | 1st 4 of those vols. | 2nd 4 of those vols. |
|---|---|---|---|---|---|---|---|---|---|---|
| | 3 | 4 | 5 | 6 | 7 | 8 | 10 | | | |
| Control— | | | | | | | | | | |
| Unvaccinated blood | 24 | 16 | 9 | 3 | 0 | 0 | 1 | 54 | 52 | 2 |
| | 29 | 12 | 2 | 3 | 0 | 0 | 0 | 46 | 46 | 0 |
| | 20 | 9 | 20 | 0 | 4 | 1 | 0 | 54 | 49 | 5 |
| | 29 | 7 | 3 | 3 | 0 | 3 | 0 | 45 | 42 | 3 |
| | | | | | | | | 50 | 47½ | 2½ |
| Blood vacc. with— | | | | | | | | | | |
| B.E. 1000 million .. | 2 | 0 | 2 | 1 | 0 | 1 | 0 | 6 | 5 | 1 |
| B.E. 500 million .. | 11 | 8 | 5 | 0 | 1 | 0 | 0 | 25 | 24 | 1 |
| 2000 killed staph. | 15 | 4 | 6 | 2 | 0 | 0 | 1 | 28 | 27 | 1 |
| 4000 „ „ | 23 | 14 | 14 | 14 | 4 | 0 | 0 | 69 | 65 | 4 |

* Nos. 1 and 2 nil. Staph. = staphylococci.

## Increased Phagocytosis Obtained by Inoculation of Blood in vitro.

Precisely similar effects—and effects which show that we are here dealing with a general law—are seen in phagocytic experiments in which an inoculated blood is tested with progressive dilutions of a staphylococcus culture.

*Phagocytic Expt.*—A. E. W.'s blood centrifugalised with different strengths of Tuberculin B.E. and different strengths of staphylococcus vaccine. (Table XXII.)

TABLE XXII.

| — | Phagocytic indices tested with— | |
|---|---|---|
| | 5-fold diluted sterilised culture. | 15-fold diluted sterilised culture. |
| Control blood .. .. | 1·0 | 1·0 |
| Blood with— | | |
| B.E. 1000 million .. .. | 0·76 | 1·63 |
| B.E. 200 million .. .. | 0·66 | 1·0 |

No preliminary incubation.

*Phagocytic Expt.*—A. E. W.'s defibrinated blood mixed with different strengths of Tuberculin B.E. and different dilutions of staphylococcus and then centrifugalised immediately after mixture. (Table XXIII.)

TABLE XXIII.

| — | Phagocytic indices tested with— | | | |
|---|---|---|---|---|
| | Undiluted culture. | 3-fold dilution. | 9-fold dilution. | 27-fold dilution. |
| Control blood .. | 1·0 | 1·0 | 1·0 | 1·0 |
| Blood with— | | | | |
| B.E. 1000 million .. | 1·5 | 2·45 | 1·65 | 1·2 |
| B.E. 5000 million .. | 1·4 | 1·0 | 1·0 | 0·96 |

*Phagocytic Expt.*—A. E. W.'s defibrinated blood implanted with Tuberculin B.E. and centrifugalised immediately after mixture with progressive dilutions of staphylococcus. Where the higher dilutions of staphylococcus were employed the length of centrifugalisation was increased in order to obtain a conveniently large ingest. (Table XXIV.)

TABLE XXIV.

| — | Phagocytic indices tested with— | | | |
|---|---|---|---|---|
| | An undiluted culture. | 3-fold dilution of the culture. | 9-fold dilution of the culture. | 27-fold dilution of the culture. |
| Control blood .. | 1·0 | 1·0 | 1·0 | 1·0 |
| Blood with B.E. 1000 mill. | 1·05 | 1·1 | 1·35 | 1·4 |
| Duration of centrifugalisation .. | ½ min. | 1 min. | 2 min. | 2 min. |

The rationale of these results is obvious. They show us that when the blood is implanted with a moderate quantum of living microbes and a moderate quantum of vaccine is added, the antigens derived from these twin sources may constitute, taken together, an optimum immunising stimulus. They show us further that when the implant of living microbes is cut down, and the antigen derived from this source is correspondingly diminished, the quantum of vaccine may be profitably increased. And vice versa when the implant of living microbes is increased the quantum of vaccine must be correspondingly cut down.

Before leaving this question a word may be said concerning the situation in which we find ourselves when dealing with a patient who has an acute infection, and we are in doubt as to whether he can still make response to a vaccine, and if so as to what quantum can be safely administered. In this situation we can, by recourse to what I have called the Vaccine Response Test[17] obtain the required information.

The "*Vaccine Response Test*" consists in adding to the patient's blood in vitro graduated quanta of the vaccine which it is proposed to use, and seeing whether any of the doses employed enhance, after some arbitrarily fixed period of incubation, the phagocytic power of the patient's blood, or whether all doses of vaccine impair that power.

I have elsewhere[18] published data showing the help that can be obtained from the vaccine response test. But I should like to say here that when in a rapidly advancing infection we needs must decide in the dark, it is always advisable to try the effect of inoculating with a very small dose of vaccine. For the advantage that may accrue if the patient's blood is still capable of making immunising response far outweighs the harm that might result if his were incapable of making immunising response, and the case already hopeless.

Let me now come back from this digression and consider yet another question in connexion with the dosage of vaccines. I can best introduce the point by recalling that while in the case of ordinary vaccines some of the antigen is in solution, the bulk of it is present in the form of particulate matter which is (I am thinking here in particular of vaccines made from serophytic microbes) not very readily soluble in the blood fluids. It follows that if there is, when the vaccine comes into operation upon the blood, any immediate immunising response, this will be response to that fraction of the total antigen which is in solution in the vaccine, or is, as the case may be, immediately brought into solution by the blood fluids. Such subitaneous response takes in the typical curve of opsonic response (figured in my "Studies of Immunisation," p. 379, Chart I), the form which I there called a "false rise," and this

*Phagocytic Expt.*—A. E. W.'s defibrinated blood treated with staphylococcus vaccine and tested with staphylococcus by the method of centrifugalisation at intervals after vaccination. (Table XXV.)

TABLE XXV.

| — | Phagocytic indices. | | |
|---|---|---|---|
| | Immediate result. | After 1 hr. 45 min. on bench. | After a further 45 min. at 37° C. |
| Control blood .. .. .. | 1·0 | 1·0 | 1·0 |
| Blood inoculated with 10,000 dead staph. per c.cm .. .. .. | 1·23 | 0·55 | 0·18 |
| Blood inoculated with 5 million dead staph. per c.cm. .. .. .. | 1·33 | 0·77 | 0·31 |

*Phagocytic Expt.*—A. E. W.'s defibrinated blood vaccinated with Tuberculin B.E., and tested at intervals after vaccination by centrifugalisation with staphylococcus. (Table XXVI.)

TABLE XXVI.

| — | Phagocytic indices. | |
|---|---|---|
| | Tested immediately after vaccination. | After 1 hr. 20 min. incubation. |
| Control blood .. .. .. | 1·0 | 1·0 |
| Blood inoculated with— B.E. 1000 million .. .. | 1·5 | 0·6 |
| B.E. 200 million .. .. | 0·57 | 0·7 |
| B.E. 10 million .. .. | 0·53 | 0·7 |

*Phagocytic Expt.* 22.10.25.—A. E. W.'s blood and the same blood treated with two strengths of Tuberculin B.E. Tested phagocytically by centrifugalisation with staphylococcus at different intervals after vaccination (Table XXVII.)

TABLE XXVII.

| — | Phagocytic indices. | | | | | |
|---|---|---|---|---|---|---|
| | 5 min. | 10 min. | 20 min. | 40 min. | 90 min. | 140 min. |
| Control blood .. .. | 1·0 | 1·0 | 1·0 | 1·0 | 1·0 | 1·0 |
| Blood inoculated with— B.E. 1000 million .. .. | 0·82 | 0·94 | 1·0 | 1·15 | 1·63 | 1·6 |
| B.E. 50 million .. .. | 0·6 | 0·56 | 1·0 | 0·8 | 0·76 | 0·86 |

*Expt.* 23.10.27.—A. F.'s defibrinated blood implanted with Tuberculin B.E. and kept in the incubator and tested at progressive intervals after vaccination by centrifugalisation with staphylococcus. (Table XXVIII.)

TABLE XXVIII.

| — | Phagocytic indices. | | | |
|---|---|---|---|---|
| | 5 min. | 10 min. | 1 hr. | 1 hr. 20 min. |
| Control blood .. | 1·0 | 1·0 | 1·0 | 1·0 |
| Blood inoculated with— B.E. 500 million .. | 0·89 | 0·86 | 1·53 | 1·64 |
| B.E. 5 million .. | 1·25 | 1·1 | 1·25 | 1·0 |

*Expt.* (*undated*).—A. F.'s defibrinated blood incubated with Tuberculin B.E. and tested at progressive intervals after vaccination by centrifugalisation with staphylococcus. (Table XXIX.)

TABLE XXIX.

| — | Phagocytic indices. | | | | |
|---|---|---|---|---|---|
| | 10 min. | 14 min. | 20 min. | 25 min. | 30 min. |
| Control blood .. | 1·0 | 1·0 | 1·0 | 1·0 | 1·0 |
| Blood with B.E. 300 million | 1·46 | 1·47 | 1·31 | 1·30 | 0·90 |

[17] THE LANCET, 1923, i., 473.
[18] Ibid., p. 475, 1923.

"false rise" is, according as the quantum of antigen afterwards dissolved is appropriate or excessive, followed by either a positive phase unpreceded by a negative, or a negative phase followed by a positive. All this is very clearly shown in the subjoined series of protocols.

There remains one last point which I should like to call attention to. It is again a point of similarity between the effects produced by infection in vivo and those produced by inoculation in vitro. It will perhaps be remembered that I have from the very outset called attention to the fact that patients suffering from lupus and generally from strictly localised forms of tuberculosis,[19] unaccompanied by constitutional disturbance, have a very low opsonic index to tubercle.

The phenomenon is clearly not one of the same order as the negative phase. For negative phases supervene, not upon minimal auto-inoculations, such as can here come in question, but only upon large inoculations or auto-inoculations. Further, a negative phase is practically always followed by the response in the form of a positive phase, and the indices of these patients remain, as can be inferred from the fact that their tuberculo-opsonic indices are uniformly low, chronically below standard. Every one of these points finds its parallel in the results obtained by the inoculation of the blood with minimal quanta of vaccine.

It has already been seen in one of the protocols of hæmobactericidal experiments which I have shown—and I could have very easily produced others showing the same—that when minimal quanta of living microbes are implanted into the blood on the one hand and serum on the other, more microbes develop into colonies in the blood than in the serum. The same thing may be seen when the sera of bloods which have been treated with minimal quanta of vaccines are tested for bactericidal power by implantation with staphylococcus. Such sera are very often found to furnish a better culture medium for staphylococcus than the control sera. And again, the addition of minimal quanta of vaccine to a phagocytic mixture often lowers the phagocytic index.

In conclusion, I have to express my gratitude to my fellow-workers, and in particular Prof. A. Fleming, Dr. Leonard Colebrook, Dr. R. M. Fry, and Dr. R. Mummery, for having very generously placed not only their work, but also their ideas at my disposal.

[19] The data relating to this question and also important confirmation of these data by Prof. W. Bulloch are to be found in my Studies of Immunisation. (pp. 118, 152, and 146–148).

PROPOSED COMPLETION OF KING'S COLLEGE HOSPITAL.—The authorities of this hospital, in view of the powers conferred by the Local Government Act of 1929 upon county councils, have invited the London County Council to discuss with them the purposes to which the completion of the building might be devoted. In view of the desirability of providing maternity beds, it is suggested that further accommodation of this kind might be supplied in association with the council, whose survey of the hospital needs of its area showed that at least another 1000 beds were needed in South London, many of them maternity beds.

GORHAMBURY AS A TEMPORARY MENTAL HOSPITAL.—The Earl of Verulam's seat, Gorhambury, St. Albans, has been taken on lease by the Middlesex county council as a temporary mental hospital. The lease, which includes 18 acres of surrounding land, is to run for from five to seven years pending the completion of the new hospital at Porter's Park. The council will spend a maximum of £10,000 in adapting and equipping the house to accommodate 150 patients. The first section of the Porter's Park scheme (1000 patients) will cost £520,336.

# THE PULMONARY ARTERY IMPRESSION ON THE ŒSOPHAGUS.

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(WITH ILLUSTRATIVE PLATE.)

WHEN a thick suspension of barium sulphate is swallowed, an observer may see by radioscopy the whole course of the œsophagus, which is, in a special sense, visualised. The procedure is so simple, and the anatomical relations are so favourable, that for years cases of dysphagia have been investigated in this way. It is an obvious method to employ in disease of the œsophagus itself (cardiospasm, simple stricture, and carcinoma), and in conditions which may produce pressure upon it (aneurysm and intrathoracic neoplasm). Though its use in patients with thoracic aneurysm is subsidiary to inspection and radiography of the aorta and the sac itself, yet barium in the œsophagus often helps to define the swelling and to localise it.

Radiology was first applied to the diagnosis of cardiac disease long before the war, but till recently it has been little used in this country as part of the systematic examination. Yet it could be maintained that it gives as much useful information—taking a large consecutive series of patients—as electrocardiography.

Apart from the matter of aneurysm, the relation of the œsophagus to the aorta has been used as a means of measuring the diameter of the aorta in normal and pathological states. As the arch of the aorta passes backwards and to the left to reach the spine, its wall touches the œsophagus. The relation is so close that on the barium-filled œsophagus appears an impression which is called by Kreuzfuchs[1] the aortic bed. He made use of the fact in measuring from the middle of this impression or bed transversely across to the most lateral point of the aortic knuckle to obtain the diameter of the aortic arch (Fig. IV.). This natural impression by the aorta on the œsophagus is also visible in the first oblique position—i.e., with the patient turned half-left. The opaque bolus is momentarily held up at this level, for there is not only displacement, but constriction (Fig. XII.).

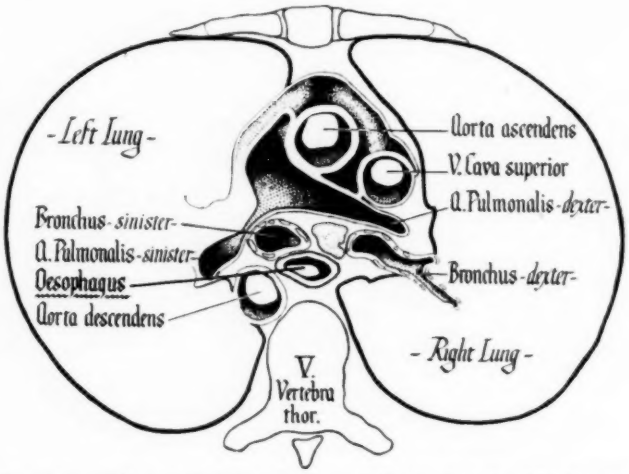
The second current application of the visualised œsophagus to cardiac diagnosis is the displacement produced by the enlarged left auricle in mitral stenosis. The worth of this almost pathognomonic sign of mitral stenosis has not even yet been realised. It is seen better in the first oblique position (patient facing half-left) than in the anterior (Fig. X.).

Still other conditions have been studied by observing their effect upon the œsophagus. There is a congenital anomaly of the aorta in which the aortic arch passes over the right bronchus instead of the left (right-sided aortic arch); here the œsophagus presents a convexity to the left. In this condition there may be a diverticulum of the aorta behind the œsophagus (persistent left aortic root), giving rise to the left subclavian and ductus arteriosus; or the aorta after

passing over the right bronchus may cross to the right behind the œsophagus, displacing it forwards and to the left. When the left subclavian takes an aberrant course behind the œsophagus, dysphagia may result (dysphagia lusoria), and there may be a diagnostic dent on the barium-filled œsophagus. A similar dysphagia may be produced when the aortic arch is normally situated on the left, by an aberrant right subclavian artery running behind the œsophagus.

In making routine examinations by radioscopy in the first oblique position, we have noticed another impression on the œsophagus, one which seems to have escaped attention. It lies between the two impressions already mentioned, the aortic above and the auricular below, forming a sort of "middle arc" in the first oblique view of the heart. In some degree it is often seen in healthy persons, but it is modified or exaggerated in certain diseases, particularly, we think, in those associated with enlargement of the pulmonary artery and its branches.

FIG. I.



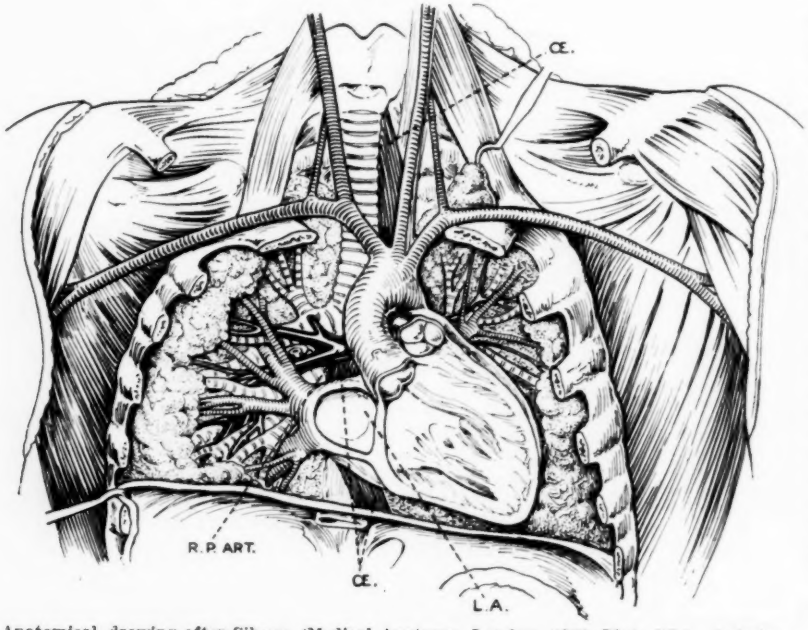

Transverse section of the normal thorax at the level of the fifth thoracic vertebra (specially drawn after Eycleshymer and Shoemaker, 1911). The relation of the pulmonary artery and its right branch to the left bronchus and to the œsophagus is shown.

## Course and Calibre of the Œsophagus in the Thorax.

Viewed from the front, the œsophagus does not run vertically downwards, but inclines to the left of the middle line from the neck to the fourth thoracic vertebra, there to regain the middle line or even to bear to the right of it where the aortic arch is passing on its left. Below this it often takes another gentle curve to the left, which becomes accentuated in the lower portion, where it crosses in front of the descending aorta. In old people with atheroma of the descending aorta, the lower curve of the œsophagus to the left may be pronounced. During inspiration or in a long chest the œsophagus tends to be straighter than during expiration or in a short chest, or where the diaphragm is high.[2]

Viewed from the side, the œsophagus as a whole shows a long, slight curve backwards behind the aortic arch and the heart. It is applied to them much more intimately than to the spine or to the descending aorta, which so closely follows the spine. In fact, from the fifth thoracic vertebra the œsophagus leaves the spine and lies closely on the back of the heart. In kyphosis, for instance, it does not adhere to the bent spine but to the heart, thus taking a more direct course. It is noteworthy that the œsophagus is only firmly fixed at the pharynx and the diaphragm; nowhere else in its course are there firm attachments, so that it is easily displaced by adjacent swellings.

FIG. II.




Anatomical drawing after Sibson (Medical Anatomy, London, 1869, Plate VI.). Anterior view after removal of the right auricle and right ventricle. The course of the œsophagus (Œ.) is shown in relation to the arch of the aorta, the bifurcation of the trachea, the right pulmonary artery (R.P. Art.), and the left auricle.

Much has been written on the natural constrictions of the œsophagus, chiefly from the anatomatical and surgical aspects. Admitting the relative narrowing at its origin, at its passage through the diaphragm, and at its termination in the stomach, we think that constrictions described in its intrathoracic course may be of a different nature. Two are described—one where the aortic arch abuts on it; the other where the left bronchus crosses

it obliquely. From the radiological aspect these are natural *compression* stenoses, for there is narrowing as well as deviation. There is not only an aortic bed, but also a left bronchial bed.[5] These are grooves on the œsophagus which determine at once the cause and site of the constrictions.

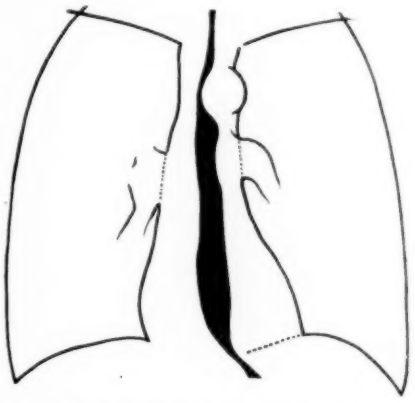
### Relations of the Œsophagus to the Heart and Great Vessels.

The arch of the aorta passes backwards, then downwards and to the left or reach the spine at the fourth thoracic vertebræ, whereafter it continues as the descending aorta. The arch crosses in front of and then passes backwards on the left of the œsophagus, which it touches.

The œsophagus lies behind and a little to the left of the trachea. Opposite the fourth vertebra the aorta pushes it to the middle line. At the tracheal bifurcation, facing the fifth vertebra, the œsophagus has again returned to the left, so that it is more in contact with the left bronchus than the right. In the angle of the bifurcation is a group of glands, but immediately below this the right pulmonary artery, running transversely within the pericardium, is in direct anterior relation to the œsophagus (Figs. I. and II.). We have confirmed this relation in the cadaver. If a sound is placed in the œsophagus, a finger passed through the cut pulmonary artery into its right branch comes into close contact with the sound. In the cross-section it will be seen that the main trunk of the pulmonary artery arches and divides at this level in close proximity to the œsophagus, though less directly in anterior relation. Thus below the aortic arch there is a segment of the œsophagus in contact with the left bronchus and the right pulmonary artery, and under the influence of the adjacent pulmonary stem (Fig. III.). Below this middle segment—which is under our consideration—the œsophagus lies behind the left auricle, round which it curves before piercing the diaphragm.

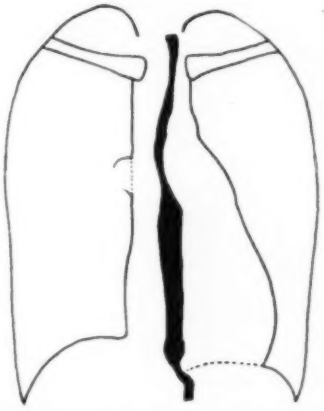
Posteriorly, the œsophagus lies loosely on the vertebral column, until it comes forward from about the fifth vertebra to cross the descending aorta so as to lie in front and on its left in their separate passage through the diaphragm.

FIG. IV.



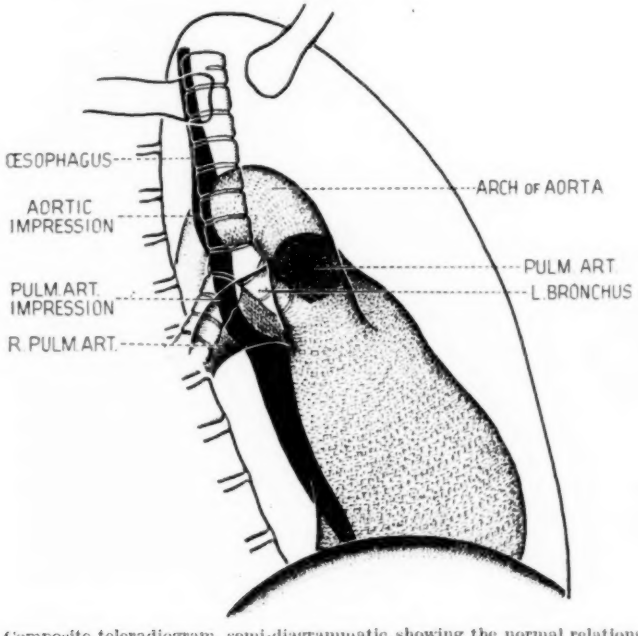
Outline of teleradiogram (anterior view) from a healthy man, aged 61, to show the aortic bed on the barium-filled œsophagus, and also the slighter pulmonary artery impression at the level of the dividing pulmonary artery—i.e., of the hilar branches.

FIG. V.



Outline of teleradiogram (anterior view) from a woman, aged 30, with congenital heart disease. It shows a slight impression on the œsophagus from the small aorta and below it a larger impression due to the larger pulmonary artery.

FIG. III.




Composite teleradiogram, semi-diagrammatic, showing the normal relations in the first oblique position (patient half-turned left). As the aortic arch passes backwards, it grooves the œsophagus, producing the upper or aortic impression. Below this is the "pulmonary artery impression," or middle curve, due to the pressure of the left bronchus, the right pulmonary artery, and the main pulmonary stem upon the œsophagus at this level. The lower or left auricular curve on the œsophagus is slight.

### The Pulmonary Artery Impression in Health.

There is an uncharted portion of the normal œsophagus, as seen by radioscopy and in radiograms after the ingestion of barium, between the aortic impression above and the left auricular impression below. This segment, as already described, is related to the left bronchus and right pulmonary artery, and adjacent to the pulmonary arch itself. We have investigated it radiologically—chiefly in the first oblique position—by inspection after giving the subject several spoonfuls of a thick paste of barium sulphate—e.g., citobaryum with a little water—and then by teleradiograms (6 ft.) taken directly after inspection.

This middle segment is about 2–4 cm. in length, and is best identified by its nearness to the lucent triangle, due to the left bronchus, which separates it from the dense shadow of the dividing pulmonary artery in front. It varies in prominence according to the degree of rotation of

the subject. The optimum position is found empirically, usually at about 45°. Often quite straight, it as often occurs as a slight curve backwards, or at least as an impression on the anterior border. Then we see the barium-filled œsophagus built of three backward curves; from above downwards: (1) the aortic impression, (2) the "pulmonary artery" impression, and (3) the left auricular impression (Fig. VI.). Sometimes (1) and (2) are combined forming a single vascular curve above the left auricular curve (Fig. X.). Where this obtains, and there are two curves in all, it is usually evident that the upper curve is larger and extends lower than could be accounted for by the aorta alone. If necessary, this can be proved by comparison with the anterior or the second oblique position. It is surprising in normal individuals how slight, almost non-existent, may be the lowest curve—i.e., that adjacent to the normal left auricle. This renders all the more noticeable the middle curve, or the combined upper and middle curve.

Even on the anterior view a slight modification of the course of the œsophagus is occasionally discerned below the aortic bed (Fig. IV.), and measurements show that it corresponds in position with the middle curve described on the lateral view. Kreuzfuchs [5] ascribes the inclination below the aortic bed simply to the return of the œsophagus to its vertical course, and, incidentally, refers to the slight effect of the left bronchus upon its lumen.

In the second oblique position (patient facing half-right) a slight aortic impression is generally visible after barium, and below it is occasionally seen a slight impression again corresponding in position with the curve we describe (Fig. VII.).

### The Pulmonary Artery Impression in Disease.

Although the "pulmonary artery" curve is often seen in conditions where there is no clinical reason for thinking that the pulmonary artery is abnormal, we find it more pronounced in conditions where the symptoms or the nature of the disease lead one to expect dilatation or engorgement of the pulmonary artery and its branches. This exaggerated pulmonary impression on the œsophagus is produced partly by direct imprint of the swollen right pulmonary artery, and partly by the left bronchus pressed against the œsophagus by the distended pulmonary stem.

An enlargement of the pulmonary arc will often have been noticed at the anterior view. By rotation of the patient to his left, on giving barium it is quickly seen that the middle curve on the œsophagus corresponds in level to the arc of the enlarged pulmonary artery. In particular, this middle curve of the œsophagus begins at the level of the summit of the pulmonary arch, much as the upper (aortic) curve of the œsophagus begins at the level of the summit of the aortic arch (Figs. VI. and XII.).

Where the aorta is lengthened from atheroma and rises in the chest high above the pulmonary arch, the latter is well seen as a dense shadow in apposition to a long, if shallow, middle curve on the œsophagus (Fig. VIII.). In a case of right-sided aortic arch, in which the œsophagus was displaced, Renander [6] found that the pulmonary artery made an impression on it.

As in the normal subject, the pulmonary artery or middle curve may be separate (Fig. XII.) or it may be combined with the aortic or upper curve (Fig. X.). The combined curve has often been taken as the aortic impression only, its undue length or curvature not being noticed. It is easily identified by placing the finger on the screen opposite the part of the curve in question, and turning the patient from the first oblique into the anterior position. It will then be found that the upper portion of the combined curve corresponds in level to the aortic knuckle, and the lower portion to the pulmonary artery at the lung roots. Where the aortic and pulmonary curves are separate they may, of course, be identified by the same plan. Occasionally, the pulmonary curve fuses with the auricular curve, producing a combined middle and lower curve.

Among the several conditions in which the pulmonary artery may be enlarged can be mentioned congenital heart disease, mitral stenosis, emphysema, goitre, and aneurysm of the pulmonary artery.

In many congenital malformations of the heart the pulmonary artery is enlarged, though by no means in all. It is, perhaps, commonest in association with patent ductus arteriosus. In general the size of the pulmonary artery varies inversely with that of the aorta; certainly when it is large the aorta is usually small. This fact is supported by our findings with the barium method, and in Fig. IX. the middle or pulmonary curve is seen to be longer and more noticeable than the upper or aortic curve. At the same time the lower or auricular curve is slight, for the left auricle is not affected (cf. mitral stenosis, e.g., Fig. X.). Not only in the first oblique position, but also in the anterior, the pulmonary artery impression may be pronounced in congenital disease (Fig. V.).

In mitral stenosis the enlarged pulmonary artery is seen in the anterior position as a prominence of the middle arc on the left heart border. It may also be seen in the first oblique position accentuating the middle curve of the œsophagus. The small aorta of this lesion forms but a slight impression on the œsophagus. In comparison, the middle curve is large, or more often it blends with the higher and slighter aortic impression to make a long and convex combined curve (Fig. X.). Yet many patients with mitral stenosis do not show the middle curve well, possibly because the large left auricle rises too high in the mediastinum to give it room.

In published accounts of the radiology of mitral stenosis the pulmonary artery impression has sometimes been reproduced on the accompanying figures without comment in the legend or text—e.g., Steel,[8] his Fig. 7; and Rigler,[7] his Fig. 8 (see also his Fig. 6).

Emphysema and other chronic pulmonary diseases sometimes lead to enlargement of the pulmonary artery demonstrable on X ray examination. In Fig. XII. this makes its mark on the œsophagus as a middle curve. In a proportion of cases of goitre, where this is affecting the heart, the pulmonary artery becomes not only more pulsatile, but more prominent, and we have examples of its imprint on the œsophagus. Aneurysm of the pulmonary artery is rare, and mostly seen with congenital defects (Fig. XI.).

Apart from cardiac conditions, it is interesting to note that in many of the published radiograms showing great dilatation of the œsophagus from cardiospasm, the lax and distended œsophagus happens to facilitate and thereby to emphasise the curve we describe (e.g., Walton,[9] his Figs. 447 and 453). As the region of the left bronchus is a favourite site for carcinoma of the œsophagus, this will be remembered and excluded before this particular displacement is referred to a cardiac condition (e.g., Assmann,[1] his Fig. 397, p. 485). Cancerous glands in the bifurcation of the trachea may also simulate the pulmonary artery curve, and such a case is figured by Grashey,[3] his Fig. 8A, p. 49.

*(References at foot of next page.)*

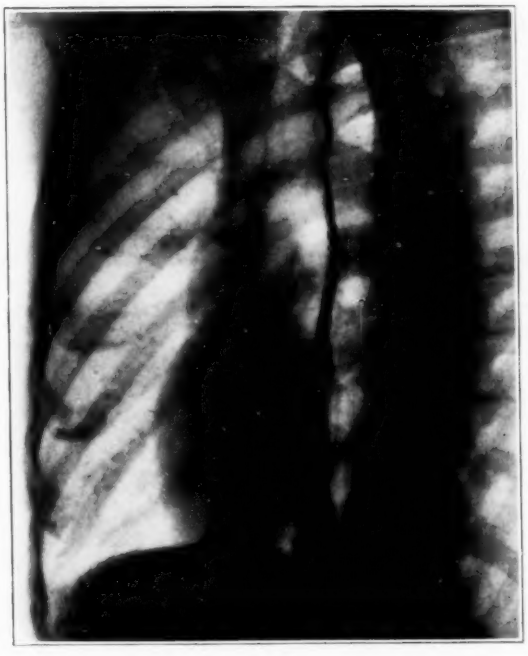
FIG. VI.

# DRS. JOHN PARKINSON AND D. EVAN BEDFORD:

# THE PULMONARY ARTERY IMPRESSION ON THE ŒSOPHAGUS.

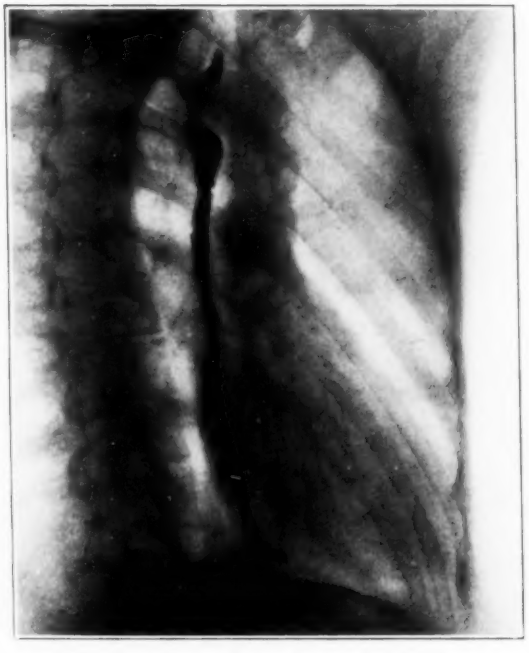
Teleradiogram (first oblique position) of normal heart. Man aged 59. The visualised œsophagus shows from above downwards: (1) the aortic curve; (2) the pulmonary artery curve; and (3) the slight left auricular curve.

FIG. VII.



Teleradiogram (second oblique position) of normal heart. Man aged 60. Below the aortic arch is seen the bifurcation of the trachea, and alongside it the pulmonary artery and its left branch. The œsophagus shows a slight aortic curve with convexity forwards, and below it a pulmonary artery curve with convexity backwards—i.e., to the right.

FIG. VIII.



Teleradiogram (first oblique position) of atheroma of aorta. Man aged 69. Below the high aortic curve of the œsophagus is a long, shallow middle curve, adjoining which is the dividing pulmonary artery (denser shadow), separated from the œsophagus by the left bronchus.

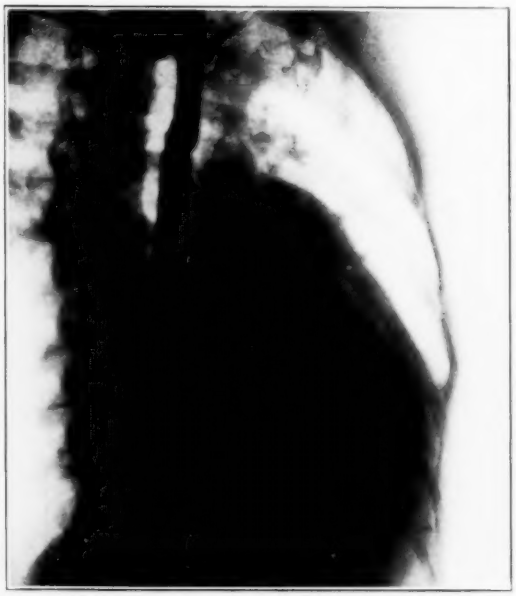
Fig. IX.

Teleradiogram (first oblique position) of congenital heart disease with enlarged pulmonary artery. Man aged 41. The thin streak of barium in the œsophagus shows a small aortic curve, a large middle curve (behind the large pulmonary artery), and a shallow auricular curve.

Fig. X.

Teleradiogram (first oblique position) of mitral stenosis with fibrillation. Man aged 44. The œsophagus shows two curves only—a combined aortic and pulmonary curve above and a prominent auricular curve below. The left bronchus separates the dense pulmonary artery from the lower half of the combined upper curve.

Fig. XI.



Teleradiogram (first oblique position) of congenital heart disease with aneurysm of the pulmonary artery. Woman aged 48. The œsophagus shows a small aortic impression, a distinct pulmonary artery impression, and the left auricular curve.

Fig. XII.

Teleradiogram (first oblique position) of emphysema and aortic atheroma. Woman aged 66. The relation of the upper œsophageal curve to the aorta, and of the middle curve to the pulmonary artery, is shown.

# ON THE PREVENTION OF MALARIA WITH PLASMOQUINE.

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and

P. G. Shute,

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In The Lancet of June 6th (p. 1248) reference was made to our experiments having for their object to ascertain whether any known or reputed anti-malarial remedy is a true preventive of human malarial infection contracted in the natural way by the bites of mosquitoes. The principles and technique of our method of test were described, and our finding was reported that the synthetic preparation, Beprochin (now supplied as tablets labelled "Plasmoquine brand of beprochin"), successfully fulfilled the requirements of the test in all of eight experiments, while similar trials with six other preparations invariably failed to do so. Following this finding, we repeated the experiments with plasmoquine on a further series of patients at the Horton Mental Hospital, Epsom, and two of us tested its prophylactic efficacy on themselves, one (W. D. N.) to protect against benign tertian infection, the other (P. G. S.) against malignant tertian. The same success having attended these trials, we decided that it would be justifiable to call for volunteers to undertake a confirmatory experiment. In this matter we were greatly assisted by Sir Almroth Wright, who kindly permitted the experiment to be conducted under his auspices at the Institute of Pathology and Research, St. Mary's Hospital, and by Dr. Ian Maclean, Prof. A. Fleming, and other workers in the Inoculation Department of the hospital, who made themselves responsible for the attendance and supervision of volunteers and for other important details. Dr. Wilfred Harris kindly arranged that a patient who was to undergo a course of malario-therapy in St. Mary's Hospital should serve as a control case, and we arranged for other control cases at St. Thomas's Hospital, the West End Hospital for Nervous Diseases, and elsewhere. One of us (S. P. J.), who had not hitherto tested the prophylactic action of the drug on himself, took part in the confirmatory experiment, and the other volunteers were: Messrs. E. V. Bevan, L. J. Clapham, Stanley Cooper, A. G. Cross, W. B. Johnston, A. N. McCrea, R. C. MacKeith, and J. Williams and Miss E. Ward. All are students at St. Mary's Hospital Medical School.

The manner in which the experiment was conducted and its result may be described in diary form, as follows:—

## Diary of the Experiment.

July 1st: Infection of a batch of 230 *Anopheles maculipennis* for the purposes of the experiment was begun to-day by feeding on a case of benign tertian malarial fever and subsequent incubation at 25° C. The batch is No. 93. The patient's blood contains 880 gametocytes per c.mm. The count of ex-flagellating male gametocytes in moist preparations is 220 per c.mm.

July 11th: Feeding on the infecting case was repeated every alternate day until the 7th. The count of gametocytes and of ex-flagellating male parasites in the patient's blood has remained about the same as on the first day of feeding. Daily dissection of fed mosquitoes has proved that the batch is heavily infected, as many as 80 or more zygotes being found on the stomachs of some insects. To-day most of the zygotes are ripe and on the point of rupture; a few have already ruptured and discharged their sporozoites into the body fluids of the mosquito. The salivary glands of one specimen contain sporozoites.

July 12th: Sporozoites were found to be present in the salivary glands of all mosquitoes dissected to-day. Of the 230 insects with which the batch was commenced, 94 remain alive.

July 13th: The volunteers, ten in number, attended at 4 o'clock. The purpose and procedure of the experiment were explained, and each volunteer took the first prophylactic dose—namely, one tablet of plasmoquine simplex (0·02 g.). The procedure of infecting the patient in St. Mary's Hospital, who would be a control case, was demonstrated. The patient was bitten by several mosquitoes, one of which was then dissected to verify the presence of sporozoites in its salivary glands. The volunteers were informed that their prophylactic dosage would be one tablet (0·02 g.) three times a day (one after breakfast, one after lunch, and the third at bedtime) for six days, and that they would be infected to-morrow after they had taken the first two of the daily prophylactic doses. Each was given an explanatory card, ruled with headings and spaces, for noting the time at which each prophylactic dose was taken and any toxic or other symptoms observed.

July 14th: Volunteers attended in the afternoon for the procedure of being infected. Prof. W. Jameson and Prof. J. Gordon Thomson, of the London School of Hygiene and Tropical Medicine, Lieut.-Colonel J. A. Sinton, V.C., I.M.S., Director of the Malaria Survey of India, and other interested workers, kindly attended as independent observers. Cards were inspected to ascertain that the prophylactic doses had been taken, and then each volunteer was handed a separate glass jar containing five or six infected mosquitoes. Infection was effected by allowing the mosquitoes to bite the forearm through the mosquito-netting, with which the mouths of the jars were covered. The number of bites received was recorded, and from each jar a mosquito containing freshly drawn blood was selected for dissection, to prove infectivity by finding motile sporozoites in the salivary glands. The result of these dissections was positive in every instance. The numbers of infected mosquitoes by which each volunteer was bitten were: E. V. Bevan, 4; L. J. Clapham 4; Stanley Cooper, 5; A. G. Cross, 2; S. P. James, 4; W. B. Johnston, 2; A. N. McCrea, 4; R. C. MacKeith, 4; E. Ward, 3; J. Williams, 3. The third prophylactic dose on this day was taken by each volunteer ten



DRS. PARKINSON AND BEDFORD: REFERENCES.

(*Continued from previous page.*)

1. Assmann, H.: Die klinische Röntgendiagnostik der inneren Erkrankungen, Leipzig, 1928, 4th ed.
2. Eisler, F.: Wien. med. Woch., 1912, lxii., 1058.
3. Grashey, R.: Irrtümer der Röntgendiagnostik, Leipzig, 1924.
4. Kreuzfuchs, S.: Med. Klin., 1920, xvi., 36.
5. ,, ,, : Münch. med. Woch., 1921, lxviii., 1011.
6. Renander, A.: Acta Radiol., 1926, vii., 298.
7. Rigler, L. G.: Amer. Heart Jour., 1929–30, v., 574.
8. Steel, D.: Amer. Jour. Roentg., 1929, xxi., 221.
9. Walton, A. J.: Brit. Jour. of Surgery, 1925, xii., 701.

minutes after being bitten by the infected mosquitoes, instead of at bedtime. A patient at the West End Hospital for Nervous Diseases was selected as a second control case, and was infected by the bites of six mosquitoes.

July 15th: All taking part in the test attended again for verification of the numbers of bites received, and to ascertain that the prophylactic doses were having no ill effect.

July 17th: All attended again to receive an explanation of the manner in which the result of the experiment would be ascertained and recorded. It was pointed out that the average incubation period in benign tertian malaria caused by mosquito-bites is 14 days, but may be as short as 10 days or as long as 20. It was to be expected that the control case at St. Mary's would begin his malarial attack sometime during the week beginning Monday, July 27th (the 14th day after infection), and it was during that week and the next that the result of the prophylactic experiment would be ascertained and recorded. For this purpose each volunteer was particularly requested: (1) To record, on the second card provided, his temperature twice daily from Friday, July 24th, to Wednesday, August 5th, as well as any symptoms indicating a possible onset of malaria; (2) to attend on July 27th and 31st and August 5th for a specimen of blood to be taken and examined; (3) to keep in touch with us by telephone throughout the period of the experiment, and at its termination to return the cards filled in and signed, together with any personal observations which it might be desirable to note.

July 27th: Volunteers attended, as requested. Benign tertian malaria parasites were found in thin blood films of the control case at St. Mary's, but in neither thick nor thin films of the blood of any of the volunteers. Up to the present (by inadvertence on our part) the temperature of the patient at St. Mary's has been taken only twice daily (at 6 A.M. and 6 P.M.). For this reason it has happened that the actual day on which he commenced his malarial attack is not apparent from the chart, but from to-day his temperature will be recorded every four hours. The finding of parasites in a thin film indicates that, in all probability, he has had slight attacks of fever (lasting, perhaps, only a few hours) for one or two days; in any case, we can take the first date on which parasites were found as indicating the incubation period, which would thus be 14 days. In striking contrast is the fact that no volunteer has observed any symptom indicating the possible onset of a malarial attack, and that careful examination of both thick and thin films of their blood has yielded a negative result.

July 29th: The patient at St. Mary's had a temperature of 100° F. last evening and 102° F. this morning. The patient at the West End Hospital is also reported to have definite febrile paroxysms, indicating that the malarial attack has commenced.

July 31st: Volunteers attended, as requested. Blood films (thick and thin) were taken and carefully examined. In no case were parasites found, and no volunteer has felt any sign or symptom indicating a possible onset of malaria.

Aug. 5th: A third control case, infected at St. Thomas's Hospital by the bites of nine mosquitoes on July 17th, began his malarial attack on the 30th (incubation period 13 days), and a fourth (under Dr. W. J. Adie), infected by the bites of eight mosquitoes on July 20th, began his attack on Aug. 1st (incubation period 12 days). The control case at Horton, infected on July 20th, and given prophylactic doses of quinine before being bitten and daily for eight days thereafter, began to have febrile paroxysms from Aug. 1st (incubation period 12 days), but parasites have not yet been found in the peripheral blood. The mosquitoes used for infecting these and other control cases are those which bit the volunteers. Six volunteers attended to-day, and the remaining four (who were absent from London) will send their blood films and cards. No volunteer has felt any sign or symptom indicating a possible onset of malaria.

Aug. 7th: Blood films and completed cards of all volunteers have now been received and carefully examined. All blood films are negative, and no indication of malaria has been observed. In striking contrast is the fact that the control cases, infected by the same mosquitoes—namely, four persons who took no prophylactic and one who took quinine as a prophylactic—all developed malarial fever 14 days or less after infection.

Aug. 10th: To-day is the 27th day since the volunteers were infected. None has had any indication of malaria. On the 8th parasites were found in the blood of the patient at Horton, who, to serve as a control, was given quinine prophylactically for eight days, and she, as well as each of the other control cases, is now going through the usual malarial attack, with many parasites in the blood and quotidian or tertian rigors, during which the temperature rises to 105° F. or 106° F. The experiment may, therefore, be considered to have terminated.

## Conclusion.

This experiment, and the 15 equally successful trials which preceded it, prove that plasmoquine effectively prevents mosquito-borne malarial infection among a group of healthy individuals who take the prophylactic doses. Quinine lacks this remarkable property. The successful result in the present test was obtained by taking 0·02 g. on the day before infection, and the same dose thrice daily on the day of infection and on the five following days, but, from the results of our previous tests, we know that somewhat smaller doses taken over a shorter period are equally effective. The next step should be to ascertain whether the preparation is effective when taken only once daily, and, if so, what may be the smallest daily dose which will prevent malarial infection in persons who are bitten by infected mosquitoes twice or thrice weekly over a prolonged period.

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SWEEPSTAKES FOR HOSPITALS.—The Rev. E. J. T. Bagnall, secretary of the London Free Church Federation, recently sent a circular letter to 51 hospitals in Greater London, asking for their views on the desirability of raising money by means of sweepstakes. The Nose, Throat, and Ear Hospital, Golden-square, was the only institution which sent a favourable reply.

SUICIDES DUE TO GAS POISONING.—Returning a verdict of suicide while of unsound mind at an inquest at Hove on August 7th, on a single woman, aged 56, who was found gassed, Dr. E. F. Hoare, the coroner, commented on the fact that at the recent meetings of the British Medical Association at Eastbourne the question was raised as to whether it was possible to make the inhaling of gas obnoxious. Suicide by gas poisoning, he went on to say, was undoubtedly so easy and convenient that anyone who was a little unbalanced yielded to the temptation. If gas could be made more unpleasant to inhale its employment for self-destruction would probably be limited. In many cases, he added, if there were no gas at hand the suicide would have chosen no other form of death. On behalf of the gas company it was stated that the question would receive the consideration of the gas industry.

# TOURNIQUET PARALYSIS.

## A PLEA FOR THE EXTENDED USE OF THE PNEUMATIC TOURNIQUET.

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Tourniquet paralysis is a sufficiently common complication of operations upon the arm and hand to warrant the careful consideration of every surgeon who is in the habit of operating on the limbs, yet I have been unable to find any reference to the condition in the English literature, and only one or two short articles in the French.[1 2]

The advantages of a bloodless field are so many that it is unnecessary to stress them here. The time lost in checking hæmorrhage is in itself a sufficient handicap to condemn any operation upon a limb that is not performed below a tourniquet. Yet there are surgeons who purposely refrain from using this aid, owing to the fear of inducing a tourniquet paralysis. What can be more disheartening to a surgeon than to perform an operation cleanly and simply with the help of a tourniquet, only to find convalescence marred by a paresis lasting throughout that critical period when voluntary active movements are so essential in the restoration of function?

### Causation.

There are several possible factors in the causation of this calamity. It is difficult, at the outset, to assess the importance of the mere anæmia induced by the tourniquet upon the nerves themselves. From our knowledge of the sensitiveness of certain nervous structures to anæmia, paralysis of the nerves might be expected to follow at once upon the interruption of their blood-supply. Concussion of the brain—with immediate and complete cessation of function of the higher centres—is, according to most authorities, the result of sudden cerebral anæmia. Yet it is remarkable how little all the tissues of the limb—the nerves included—are affected in the vast proportion of cases where a tourniquet is used. As far as can be determined, the function of these structures is usually unimpaired by interference with their blood-supply for relatively long periods.

I have no knowledge of "ischæmic" contracture following the use of a tourniquet. This condition is, according to recent observations,[3] more likely to be due to venous than to arterial obstruction. The paralysis of nerves that occurs in 60 per cent. of cases of "ischæmic" contracture[4] is a secondary phenomenon, caused by the strangulation of the nerves in the inevitable fibrosis, and must not be confused with tourniquet paralysis. In the "ischæmic" cases the nerve paralysis comes on gradually, and can be, to some extent, relieved, if so desired, by freeing the encircling fibrous tissue.

Numbness of the finger-tips occurs fairly frequently after the use of a tourniquet. Numbness of the leg or of the forearm can be induced if the limb be kept acutely flexed for a long time, and passes off rapidly when normal posture is restored. These instances suggest a vascular phenomenon, as would also the case, recently brought to my notice, where a complete paralysis of the arms followed an operation for gall-stones, the arms being placed above the head during the operation. It is, nevertheless, probable, from the fact that most patients suffer no inconvenience after the application of a tourniquet, that anæmia of the nerves cannot be the sole cause of paralysis. The slow rate of recovery in a manifest case—two or three months—also indicates a graver lesion.

The time factor is by some held to be important. Forty-five minutes has been thought to be a safe limit, but from the fact that it is impossible to regulate other factors—such as the amount of the pressure applied—it is obvious that there is a wide margin of error. I have seen paralysis follow relatively short operations.

The type of the tourniquet has undoubtedly some influence. Most are agreed that the older thick rubber tube should never be used. A flat band, of the nature of an Esmarch's or Martin's bandage, seems safer, but, again, is not immune from serious consequences. It is true that paralysis does not follow with such readiness if the tourniquet is placed high up in the arm, so as to encircle the mass of the deltoid, or around the mass of muscles immediately below the elbow. I have, however, seen it in the former case.

The most significant fact in the study of this condition is that the paralysis is practically unknown in the leg. I have heard of only one case, and I have never seen one. In the leg the nerves are always, except where the common peroneal (external popliteal) crosses the neck of the fibula, relatively well covered and protected by muscular tissues, and nowhere come into close contact with the bone. In the arm, however, the neuro-vascular bundle can easily be palpated against the humerus along the inner side of the upper arm, and the radial (musculo-spiral) nerve runs in immediate contact with the humerus as it courses from the medial to the lateral side. This is the nerve usually affected in lesions due to the tourniquet.

The fact that the nerves are sensitive to pressure is well known. The axillary (circumflex) nerve is often affected in dislocations of the shoulder, and the radial (musculo-spiral) in "Saturday night paralysis." The ulnar nerve may be injured if the arm is left hanging against the edge of the operating table during anæsthesia, and is frequently compressed, even in the absence of vascular changes, by the fibrous band associated with a cervical rib. In some people if the arm is kept acutely flexed at the elbow with the hand at the back of the head, as when lying in bed, a tingling is produced in the hand, accurately corresponding with the area of distribution of the ulnar nerve. If the legs are kept crossed for long, a similar tingling occurs in the distribution of the common peroneal, due to pressure on its trunk behind the neck of the fibula.

From these considerations it seems almost certain that the paralysis following the use of a tourniquet is due to the effect of the direct pressure of the encircling band upon the nerves, pressing them against the bone, and not to any extent to the effect of a simple anæmia. This is borne out by the peculiar sensitiveness of the radial nerve, fitting in so well with anatomical considerations and so difficult to explain by any vascular process.

An explanation must also be found for the fact that the sensory fibres in a mixed nerve trunk suffer less than the motor fibres. Sherren[5], in his description of "incomplete nerve injuries," denies this dissociation, but the present series of cases show it clearly. It has been stated by Stoffel[6] and others that there is an exact grouping of the nerve-fibres in a mixed nerve, and that the sensory fibres run in the middle. This might suffice to explain why the sensory fibres recover soonest, or even escape damage, in a tourniquet lesion. But Stopford[7] stresses the evidence of Heinmann, Compton, Borchardt, and Wjasmenski, and

Langley and Hashimoto, which is opposed to Stoffel's view. It appears that the course of any group of nerve-fibres in a peripheral nerve is modified by the existence of internal nerve plexuses, and that it is impossible to foretell the position that these fibres may occupy at any point in the nerve. The same intraneural pattern is not present in the two arms of the same individual, much less in the same nerves of different individuals. This makes the explanation of the dissociation between motor and sensory fibres even more difficult, and I feel that it is impossible to give a decided opinion on this point.

It is likewise difficult to be certain what pathological processes are taking place in the damaged nerve, but from the slow rate of recovery in most cases, and from the development of an undoubted reaction of degeneration in some, there seems to be an actual destruction of nerve-fibres, and repair follows the usual course seen in complete division, with downgrowth of new axons from the proximal end. In the latter instance, the recovery time is much longer, owing to the impossibility of approximating individual nerve-fibres correctly. Schafer[8] has produced experimentally a comparison between the rate and nature of recovery in a completely divided nerve and a "physiological" division by squeezing. Recovery is much more rapid in the latter, and the sensory recovery fails to show the "two-stage" phenomena so typical in a completely divided nerve. Although in our cases the rate of sensory recovery was too rapid to allow of detailed examination, this evidence is sufficient to show that recovery of motor power in three to six months is not incompatible with complete destruction of nerve-fibres, provided the intraneural pattern is not disturbed.

I have been able to collect information of some 14 cases of tourniquet paralysis (see Table) that have attended the electrical and other departments of Guy's Hospital in the past five or six years. All of these (except one) have been seen by me at some stage or other. It is unfortunate that the records are not in every case complete. In some instances the electrical reactions were not tested, and in others the condition may have been unsuspected for the first few days—the limb being possibly on a splint—and, therefore, I have had to rely on the subjective history of sensory loss. It is true, however, to say that in all cases where there was definite anæsthesia to cotton-wool the sensory symptoms cleared up long before the motor symptoms. I therefore believe that many of the cases quoted as having "numbness" would have shown true anæsthesia had they been carefully tested in the first few days.

It is impossible to estimate the percentage incidence, nor would it serve any useful purpose, for tourniquets are used so frequently that one could not even be certain that the fact would be recorded in the reports. It is sufficient to note that these cases have occurred

TABLE SHOWING RESULTS OF TREATMENT OF TOURNIQUET PARALYSIS.

| No. | Sex. | Age. | Date of operation. | Nature of operation. | Paralysis. | Recovery time. | Anæsthesia. | Recovery time. | Electrical reactions. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Date. | Faradism. | Galvanism. |
| 1 | M. | 18 | 15/9/28 | Suture of flexors of ring finger. | Ulnar, median, radial. | 3 mths. (wrist last). | Nil. | Not recorded. | | | |
| 2 | F. | 34 | 24/8/30 | Suture of flexors of little finger. | " | 3 mths. | "Numbness of hand." | 2½ mths. | 15/12/30 | Normal. | Sluggish A.C.C. > K.C.C. |
| | | | | | | | | | 28/3/31 | " | Normal. |
| 3 | F. | 25 | 1/8/27 | Suture of flexor carp. rad. and palm. long. | Radial. | 3–4 mths. | Nil. | — | 5/8/27 | Nil. | Sluggish A.C.C. > K.C.C. |
| | | | | | | | | | 18/10/27 | Present. | A.C.C. > K.C.C. |
| 4 | M. | 17 | 22/9/30 | Removal of portion of head of radius. | Ulnar, median, radial. | 5 mths. | Tingling in hand. | 1 day. | 26/9/30 | Nil. | Nil. |
| | | | | | | | | | 14/10/30 | Present. | Moderately brisk. |
| 5 | F. | 47 | 10/1/22 | Wiring of humerus. | Radial. | 6 mths. | Doubtful. | — | 10/5/22 | Triceps only. | Extensors of fingers only A.C.C. > K.C.C. |
| 6 | M. | 24 | 19/9/27 | Plating of radius. | " | 3 mths. | "Numbness of hand." | Few days. | 17/10/27 | Present. | — |
| 7 | M. | 16 | 9/10/24 | Excision of fragment of humerus. | Ulnar, median, radial. | 1 mth. | Total forearm. | 3 wks. | Not recorded. | | |
| 8 | M. | — | 21/9/30 | Removal of cyst from wrist. | " | 2–3 mths. | " | Few days. | Not recorded. | | |
| 9 | F. | 32 | 1/3/31 | Transplantation of ulnar nerve. | " | 2–3 mths. | " | 3 days. | 26/2/31 | Present. | Present. |
| | | | | | | | | | 5/3/31 | Not well marked. | Brisk. |
| | | | | | | | | | 12/5/31 | Normal. | Normal. |
| 10 | M. | 37 | 14/4/30 | Suture of brachio-radialis tendon. | " | 4½ mths. | Nil. | — | 1/5/30 | Weak. | Weak. |
| 11 | M. | 26 | 28/3/30 | Suture of flexors to little finger. | " | 2½ mths. | Total forearm. | 3 wks. | 28/3/30 | " | " |
| 12 | M. | 20 | 20/10/24 | Plating of radius. | Radial. | 3 mths. | Hand. | 2 mths. | 21/11/24 | Normal. | Normal. |
| 13 | M. | 14 | 1/12/27 | " " | " | 3 mths. | " | Few days. | 31/12/28 | Nil. | Sluggish in extensors. |
| 14 | M. | 24 | 22/11/27 | Open reduction of old fracture-dislocation of elbow. | Ulnar, median, radial. | 5 mths. | Total forearm. | 2 mths. | 13/12/27 | Present. | Sluggish. |

in the practice of many different surgeons, the tourniquets being applied variously by the surgeons themselves, by their house surgeons or by other assistants.

### Diagnosis and Prognosis.

There ought to be no difficulty in the diagnosis of tourniquet paralysis, for the symptoms are very definite. Confusion may arise when the operative field has been closely related to a main nerve trunk, or when the lesion has remained undetected for a few days. The commonest paralysis affects the muscles supplied by the radial (musculo-spiral) nerve—the extensors of the wrist and fingers—so that "wrist-drop" ensues. In a fair proportion of cases the median and ulnar nerves are also involved, and then all movements of the hand and forearm are impossible.

The sensory loss is variable, but some anæsthesia is usually to be found if the case be examined sufficiently early. This may be complete below the point of application of the tourniquet, or limited to a small area of the hand or forearm. Tingling or numbness may be present, even in the absence of definite anæsthesia, and this is not uncommonly noted in the tips of the fingers even in cases that do not get any other symptoms. As a rule the sensory phenomena pass off in a few days, whereas the motor symptoms usually last much longer. It is particularly this dissociation between motor and sensory symptoms that helps in differentiating from a true division of one or more nerves.

The electrical reactions are variable. In the milder cases there is little, if any, alteration of reaction. In the most severe there may be a fully developed reaction of degeneration, and there may be any gradation between these two extremes. Loss of response to faradism is the earliest sign.

It is difficult to give an accurate prognosis. The rate of recovery of the sensation may be a guide, though in our series it does not appear to be reliable. The electrical reactions likewise form a rough index of the severity of the lesion. It is interesting to notice that voluntary power may return before the faradic response, and it may return quite suddenly in a night. In this series most of the cases took about three months to recover. Recovery may be delayed by the problem of litigation; or by a troublesome stiffness of the metacarpo-phalangeal and interphalangeal joints, which is only too common where movements of these joints have been inhibited for any reason.

### Treatment and Prophylaxis.

The treatment depends to some extent upon the electrical responses. Galvanism is usually instituted, and faradism is given when the muscles begin to respond to it. Massage and movements should be continuously and studiously applied to preserve the movements of the joints, and suitable splints should be used to rest the paralysed muscles. As in other injuries, active movements should be especially encouraged.

No effort is too great in the prevention of this condition. It is not the purpose of this paper to decry the tourniquet—far from it—but rather to stimulate the use of the pneumatic tourniquet. The main thing at fault with the tourniquets in common use is the complete inability to control the pressure applied. This is true also of the pneumatic tourniquets on the market, but we have now a simple instrument to be found everywhere in the aneroid sphygmomanometer of the "Tycos" pattern.

This is applied to the arm, with the dial and rubber bulb pointing proximally. It is well to include the mass of the deltoid muscle or, if the operation is upon the hand, to place the armlet around the mass of the forearm muscles. It can be used equally well in the leg. A pressure of some 20 mm. above arterial pressure ought to be sufficient, but I have generally used a pressure ranging between 160 mm. (for young people) and 200 mm. (for old people). The tourniquet may be used in conjunction with an expression bandage (Esmarch's or Martin's) applied from the distal extremity of the limb, or alone, after simple elevation of the limb for a minute or two. In any case it is placed in position before the commencement of the anæsthetic (thus saving the anæsthetic time) and inflated immediately before the operation is to begin. In an emergency it may be controlled by the anæsthetist, though obviously, as a rule, its care is best left to some other assistant.

In operations for sepsis in the hand it is invaluable, and, as its application is so simple, I think it is fair to say that no operation of this sort should ever be undertaken without its aid. In these instances a preliminary expression bandage is obviously contra-indicated, and if the tourniquet be inflated sharply, with the arm elevated, there is a trivial venous oozing upon the first incision which rapidly gives place to a bloodless field.

There is occasionally a slight leak in the instrument—in the valve at the air inlet near the rubber bulb. A light intestinal clamp or a pair of sponge-holding forceps applied to the afferent tube, leaving the dial in free communication with the rubber armlet, is usually sufficient to check this. It is, however, well to request an assistant to watch the dial occasionally and inflate from time to time if necessary. A linen bandage applied over the armlet helps to keep this firm.

During five years as surgical registrar at Guy's Hospital I have used this tourniquet for every operation upon the forearm and hand, without regret and without any complication. It would be impossible to estimate accurately the number of operations of this sort in the period, but it must total many hundreds. It would include many operations for sepsis in the hand (always a deliberate dissection), and many for suture of tendons and nerves, and multiple lacerations of the hand and fingers (often very tedious and slow). It is my view that a tourniquet paralysis should never occur if only a moderate and controlled encircling pressure of this sort is used.

I am indebted to the surgeons of Guy's Hospital for permission to use their cases, and to Mr. W. H. Trethowan, Dr. C. E. Iredell, and Dr. C. P. Symonds for their help in compiling this paper.

REFERENCES.

1. Princeteau, Abadie, and Desqueroux: Jour. de Méd. de Bordeaux, 1913, xliii., 85.
2. Lejars, F.: Semaine Méd., 1912, xxxii., 505.
3. Middleton, D. S.: Brit. Jour. Surg., 1930, xviii., 188.
4. Thomas, J. J.: Ann. Surg., 1909, xlix., 330.
5. Sherren, James: Section on Injuries and Diseases of Nerves, Choyce's System of Surgery, London, 1923.
6. Stoffel, A.: Deuts. Zeits. für Chir., 1910, cvii., 241.
7. Stopford, J. B. S.: Sensation and the Sensory Pathway, London, 1930; q.v. for other references.
8. Sharpey-Schafer, E.: Brain, 1927,, 1. 538; also Quart. Jour. Exp. Physiol., 1928, xix., 85.

SALFORD ROYAL HOSPITAL MOTORISTS' ASSOCIATION.—This organisation has been formed with the object of preventing the treatment of motor accident cases from being a drain on the funds of the hospital. Last year eight beds were constantly in use for this type of accident; the cost was £1200, towards which the patients gave only £124. The minimum annual subscription is 2*s.* 6*d.*, and motorists driving through are asked to become members by purchasing the association's metal badge and fixing it on their cars. It is hoped shortly to provide the first bed, and ultimately to supply eight.

# ANÆSTHESIA IN THE SECOND STAGE OF LABOUR IN PRIMIPARÆ.

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and
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The importance of anæsthesia in the second stage of labour is becoming more generally recognised and this investigation, as far as it has gone, suggests that there is at least one anæsthetic which can be used with absolute safety and efficiency. All the cases of this series were primiparæ. Gas and oxygen were given as a routine to all primiparæ with any degree of toxæmia, so that all the least favourable cases were included in the gas and oxygen group. For the remaining cases the anæsthetic was chosen at random. The figures for ether anæsthesia were taken from only 18 cases, and are given for what they are worth, ether having proved an unsatisfactory anæsthetic in the second stage of labour.

In each case a record was kept of the character, duration and frequency of the pains, the pulse-rate, and fœtal heart-rate, and the condition of mother and child after delivery; observations were taken every 15 minutes throughout the second stage. In the majority of cases some sedative—e.g., potassium bromide and chloral—had been given in the first stage, but the effect of such drugs had usually ceased to be evident before the anæsthetic was administered. It was impossible to estimate the effect of the anæsthetic on perineal lacerations, owing to the fact that deliveries were conducted by pupil midwives. Again, owing to the different factors operating, it was difficult to estimate the effect of anæsthesia upon hæmorrhage.

### METHOD.

Anæsthesia was commenced at the beginning of the second stage of labour. A mixture of nitrous oxide, 4 parts, and oxygen, 1 part, was given first, the proportion of the two gases being varied to suit the needs of the individual patient. The patient was instructed to take two deep breaths of the mixture at the beginning of each pain, administration being continued throughout each contraction. Towards the end of the second stage, deep anæsthesia was required, and the anæsthetic was continued between the pains. The percentage of oxygen was also increased at this point, because if the patient were allowed to become cyanosed there was a chance of the infant being rather blue. In a few cases a little ether was added to the mixture during the birth of the head.

For these investigations a McKesson's portable apparatus was used, and was found very easy to control.

### Comparison of Anæsthetics.

Other anæsthetics used in this series were: (1) chloroform (40 cases); (2) ether (18 cases); (3) chloroform 2 parts, ether 3 parts (20 cases). The effects of these anæsthetics, as compared with those of gas and oxygen, in the second stage are interesting, and are best shown by a series of tables.

*Relief of pain* was evident in all cases, and there was seldom any difficulty in persuading the patient to take the anæsthetic. Usually with gas and oxygen the patient was unaware that the baby was born, but in two cases it had no effect on the pain, and another anæsthetic had to be used. In a few cases the patient was difficult to control towards the end, but this difficulty diminished with increasing skill in administration.

Table I.—*Effect on Contractions.*

| Anæsthetic. | Frequency of contractions. | | | Length of contractions. | | |
|---|---|---|---|---|---|---|
| | Less frequent. | Same frequency. | More frequent. | Shorter. | Same length | Longer. |
| Chloroform .. | 18 | 22 | 14 | 3 | 29 | 21 |
| Ether .. .. | 12 | 5 | 3 | 1 | 7 | 12 |
| $C_2E_2$ .. .. | 7 | 6 | 6 | 6 | 5 | 8 |
| Gas and oxygen .. | 8 | 35 | 46 | 6 | 35 | 48 |

With gas and oxygen the length and frequency of the contractions were increased in 50 per cent. of cases (Table I.). Accessory muscles were used more freely when the appreciation of pain was dulled. With ether the length of the contraction was increased in 60 per cent., but the frequency was diminished in 60 per cent., and in all cases the time interval became very irregular.

Table II.—*Length of Second Stage.*

| Anæsthetic. | 1 hour. | 1–2 hours. | Over 2 hours. |
|---|---|---|---|
| Chloroform .. .. .. | 27 | 20 | 5 |
| Ether .. .. .. .. .. | 7 | 7 | 5 |
| $C_2E_2$ .. .. .. .. .. | 10 | 8 | — |
| Gas and oxygen .. .. | 64 | 30 | 6 |
| No anæsthetic .. .. .. | 32 | 56 | 12 |

Of the gas and oxygen cases lasting over two hours, five were abnormal, two being extended breeches, one a contracted outlet, one a rigid perineum, and one a distended bladder. There was a definite decrease in the length of the second stage with gas and oxygen anæsthesia compared with the length with other anæsthetics (Table II.). Fifty cases of primiparæ in which no anæsthetic was used showed a further increase in the length of the second stage. Accessory muscles were not used so well with other anæsthetics as with gas and oxygen, because with diminished perception of pain there was also a certain degree of muscular relaxation. With ether it was difficult to get beyond the excitable stage and still maintain the contractions, so that the patients were difficult to control.

*After-effects.*—With gas the patient was quickly round. With chloroform and ether the patient was drowsy at the end of the second stage and took some little time to recover from the anæsthetic. Vomiting was not uncommon, because many of the patients came into hospital in labour, directly after a heavy meal. Vomiting with gas and oxygen anæsthesia was very rare. The effect on the pulse-rate, as an indication of exhaustion, is shown in Table III.

Gas and oxygen compares very favourably with other anæsthetics, in spite of the fact that this group contains 17 cases of toxæmia, in whom obstetric exhaustion is always inclined to be more severe. In 86 per cent. of cases the pulse-rate either dropped or rose only ten extra beats per minute.

The effect on uterine contraction, as shown by

post-partum hæmorrhage, can only be suggested by the following figures, for it must be remembered that there are many other factors besides the anæsthetic which are responsible.

TABLE III.—*Pulse-rate.*

| Anæsthetic. | Rate dropped. | Unchanged. | Up 10 beats. | Up 20 beats. | Over 20. |
|---|---|---|---|---|---|
| Chloroform .. | 15 | 17 | 12 | 3 | 5 |
| Ether .. .. | 4 | 5 | 3 | 5 | 2 |
| $C_2E_2$ .. .. | 7 | 4 | 4 | 3 | — |
| Gas and oxygen | 20 | 35 | 16 | 7 | 4 |

*Hæmorrhage Exceeding 20 oz.*

*Chloroform.*—3 cases.

*Ether.*—2 cases (one case due to retained placenta).

*Gas and oxygen.*—2 cases (one case due to retained placenta and one to severe toxæmia).

The *effect on the child* is suggested by Table IV., but it must be remembered that the skill of the midwife is a large factor in the condition of the child at birth. It is a common fault for the pupil midwife to hold the head too long on the perineum, and a certain percentage of cases of blue asphyxia are due to this cause.

TABLE IV.

| Anæsthetic. | Cyanosed but crying at birth. | Blue asphyx. | White asphyx. | Drowsy and full of mucus. | Norm. |
|---|---|---|---|---|---|
| Chloroform .. | — | 7 | 1 | 2 | 40 |
| Ether .. .. | — | 3 | 2 | 1 | 13 |
| $C_2E_2$ .. .. | — | 1 | — | — | 17 |
| Gas and oxygen | 10 | 4 | 2 | 2 | 82 |

There was one stillborn infant in the gas and oxygen series, death being due to a tentorial tear.

Of the four cases of blue asphyxia with gas and oxygen anæsthesia, all were abnormal labours, and one case of white asphyxia was an extended breech. It must also be remembered that the infants of toxæmic parents are included in the gas and oxygen group.

### Summary.

There are definite advantages in the use of gas and oxygen in the second stage of labour, which may be summed up as follows:—

1. Relief of pain.
2. Uterine contractions increased in length and frequency in 50 per cent. of cases.
3. Second stage of labour shortened.
4. No deleterious after-effects on the mother.
5. No serious effects on the child. (Slight cyanosis is not uncommon, but is seldom associated with apnœa).
6. Anæsthetic pleasant to take and easy to give, and depth readily controlled.

Two *disadvantages* must be noted, both of which may be summed up in the word "expense." Special apparatus is required, and the average cost per patient is about 2*s.*, as opposed to 3*d.* for chloroform. The services of an anæsthetist are required throughout the second stage.

In conclusion we should like to thank Lady Barrett for originating this research, and for the interest she has shown throughout.

## AN UNUSUAL CASE OF HODGKIN'S DISEASE.

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THE following case of Hodgkin's disease presents a number of unusual features, any one of which is remarkable in its own way; occurring all together they appear to form a unique combination.

A married woman of 55 was admitted to King's College Hospital under the care of the late Dr. F. W. Tunnicliffe on Jan. 13th, 1927, complaining of "fluid in the stomach," which she stated had come on nine weeks previously. There was ascites and œdema of the legs. The glands in both axillæ and both groins and at the occiput were enlarged. There was a hard nodular mass (possibly glands) in the right hypochondrium and there was dullness on percussion over the mediastinum in front. The liver dullness extended up to the fourth rib but the lower edge of the liver could not be felt because of the distension. On a subsequent occasion the liver was found to be enlarged an inch below the costal margin. The spleen was palpable. The abdomen was tapped several times, about 18 pints of chylous fluid being withdrawn on two occasions. The pathological report on one specimen of the ascitic fluid showed a fair number of cells, of which 90 per cent. were lymphocytes, and a fat content of 0·26 per cent. Blood counts showed a slight secondary anæmia, with some increase in the large mononuclears, which varied from 7·6 per cent. to 16 per cent.

About two months after admission the patient developed pleurisy with effusion on the left side, and turbid yellow serous fluid, containing about 25 per cent. total protein, was removed by aspiration. The patient's general condition subsequently improved, the pleural and peritoneal effusions did not reaccumulate, and she left hospital on April 23rd, 1927, the provisional diagnosis being lymphadenoma of the "deep" type—that is, affecting the deep lymphatic glands predominantly.

For the next 12 months she attended hospital as an out-patient, during which time her general health was poor and she had a troublesome cough with occasional vomiting, but the ascites did not recur.

She was readmitted to hospital, after an interval of a year, on April 27th, 1928, complaining of fluid in the chest, abdomen, and legs, also of cough, nausea, general weakness, and dyspnœa. She stated that her relapse had started three weeks previously. On examination there were physical signs of fluid in the right side of the chest extending up to the level of the second rib in front. No enlarged glands were felt in the neck or axillæ. There was ascites, the liver was slightly enlarged, and the left leg was œdematous.

On April 28th and May 15th the abdomen was tapped, 14 pints of chylous fluid, having approximately the same composition as before, being drawn off on each occasion. On May 4th the right side of the chest was aspirated and two pints of chylous fluid removed. The pleural fluid contained many leucocytes (mostly lymphocytes), a few red corpuscles, 12 per cent. protein, and 0·3 per cent. fat. Culture was sterile. On May 24th the patient had an attack of paroxysmal tachycardia lasting rather less than 12 hours, and another similar attack occurred six days later. On June 1st enlarged glands were felt in both axillæ and in the left groin, and the mediastinal dullness on percussion was increased. On June 5th a small lymph-gland was excised from the chest wall just below the right axilla and sent for microscopical examination. On June 7th the patient had suppression of urine, and passed no more urine up to the time of her death a fortnight later. The œdema increased, the thighs and lower part of the abdominal wall becoming very swollen. The blood-urea on June 11th was 119 mg. per 100 c.cm. and on June 20th it had increased to 197 mg. per 100 c.cm. In spite of this the patient's general condition remained remarkably good and, though somewhat drowsy at times, she was usually bright and cheerful, uræmic manifestations being on the whole completely absent.

She had eaten a good midday meal, chatted brightly to the other patients, and amused them by singing on the day before her death, which occurred quite without warning; she collapsed suddenly and died on June 22nd.

At *autopsy* milky fluid was found in both pleural cavities. The entire parietal pleura on the right side and the diaphragmatic pleura on the left were infiltrated, forming a thick pinkish-grey sheet of tissue with a nodular surface. The visceral pleura over the lower lobes of both lungs was similarly affected, in one place being more than an inch thick. The underlying lung was collapsed, but not invaded. There

was a large mass in the posterior mediastinum, completely embedding the aorta and thoracic duct, and surrounding the pericardial sac but not penetrating it. The peritoneal cavity contained a large quantity of milky fluid. The whole of the parietal peritoneum was thickly infiltrated in the same manner as the pleuræ. Behind the peritoneum, lying on the spinal column, was an enormous mass of tissue, apparently derived from the pre-aortic glands. This mass extended into the left iliac fossa, infiltrating the left psoas muscle, but not invading the vertebral column, and completely surrounded the aorta, the left common iliac, and both renal arteries. The pedicles and pelves of both kidneys were completely embedded, though the ureters admitted a probe. The bladder was contracted and empty and the wall infiltrated with morbid tissue similar to that found elsewhere. With the exception of one small nodule, about the size of a pea, the liver showed no apparent involvement; nor did the spleen, which was not enlarged. The intestine was not involved except for the sigmoid colon, which was embedded in the mass of tissue in the left iliac fossa.

HISTOLOGY.

1. *Axillary gland* (removed at biopsy). The general structure of the gland is not profoundly upset and the lymph follicles are quite distinct in most areas. There is a definite proliferation of endothelial cells, with a corresponding diminution of lymphocytes. The endothelial cells show a marked tendency to fusion into syncytial masses, but giant cells of the Sternberg type are rare, though they do occur. Eosinophils are sparsely scattered through the gland. At one or two points there is a definite infiltration of cellular elements outside the capsule of the gland.

2. *Retroperitoneal mass* (from autopsy). The general structure of the mass is quite uniform and, though traces of the capsule between individual glands can be distinguished, the cellular structure of adjacent glands is continuous and uninterrupted. The cellular elements consist almost entirely of uniform masses of cells, somewhat resembling lymphocytes but larger and with more faintly staining nuclei and a larger proportion of cytoplasm. A large number of cells show mitotic figures. Here and there a few strands of tissue composed of endothelial cells are seen.

3. *Spleen* (from autopsy). The spleen presents appearances very similar to those seen in miliary tuberculosis. The general structure of the splenic tissue appears normal, but scattered through it are numerous cellular systems which closely resemble a certain type of tubercle. Typically each consists of a central necrotic area surrounded by a zone of endothelioid cells. Outside this is a zone of fibrosis, outside which again is an area of lymphocytic infiltration which merges peripherally into the normal splenic tissue. These systems are numerous and are present in various stages of development, the earliest being a small whorl of endothelioid cells surrounded by a zone of lymphocytic infiltration. Three of the lesions showed giant cells in the centre, but these were absent in most cases.

DISCUSSION.

The following chief features of the case require further discussion.

1. *The diagnosis.*—In all stages of the disease pressure effects were the most prominent and tended to dominate the clinical picture. When the case was first seen there was some enlargement of the axillary and inguinal glands, but on admission to hospital for the second time this was absent, and the superficial glands only became enlarged again about three weeks before death. At various times there was a certain amount of evidence of enlargement of the deep lymphatic glands. The diagnosis seems to depend largely (as it must finally in every case) upon the histology.

The excised gland presents a picture which (though not fully developed) is very suggestive of Hodgkin's disease, and there seems to be no possible alternative histological diagnosis. The post-mortem findings point to the retroperitoneal glands as the original seat of the disease, but the histological picture is not, as might be expected, that of lymphadenoma in an advanced stage with progressive degrees of fibrosis, but conforms very closely with Ewing's [1] description of the condition which he calls "Hodgkin's endothelial sarcoma," a malignant tumour arising by a process of metaplasia from the endothelial cells of lymph nodes affected with lymphadenoma.

When the case was first seen the spleen was palpable, but at autopsy it was not enlarged. This is unusual, since a moderate degree of splenic enlargement in lymphadenoma is the rule. In a series of 36 cases I found 86 per cent. with clinical enlargement of the spleen, and Symmers [7] in his series found 64 per cent. Microscopically the spleen showed none of the appearances of lymphadenoma, but instead a condition which is almost certainly tuberculous. Tuberculosis is a recognised complication of Hodgkin's disease, and probably occurs most frequently as an intercurrent infection in the later stages, when the general resistance of the patient has been lowered by the cachexia of the primary disease. A possible alternative is that the lesions in the spleen are miliary gummata and, in favour of this, there is some evidence of old (treated) syphilis in this case, but the diagnosis of tuberculosis seems the more likely.

2. *The remission.*—A definite remission occurred and lasted for about 12 months, during which the enlargement of the superficial glands disappeared and the ascites, which had previously been present and had been tapped several times, did not recur. Remissions are well known in Hodgkin's disease, but the present case seems noteworthy both for the length of the remission and for the actual regression of the glandular enlargements which occurred.

3. *The occurrence of chylous ascites and chylous hydrothorax.*—These are rare though recognised complications of Hodgkin's disease, and result from pressure on the thoracic duct by enlarged glands. In the present case the thoracic duct was found at autopsy to be completely embedded in the mass in the mediastinum. Scholberg and Wallis [4] have collected 60 cases of chylous and pseudo-chylous hydrothorax, and 173 cases of chylous and chyliform ascites in which the percentage of cases due to lymphadenoma is only 5 per cent. and 2·3 per cent. respectively.

4. *Infiltration of serous membranes*, such as occurred in the pleura and peritoneum in this case, is another rare complication and may be partly responsible for the effusions produced. The pleural effusion may be produced by obstruction of the azygos and hemiazygos veins, and by the production of a chronic pleurisy with effusion. Symmers [8] has described two cases of lymphadenoma in which there was massive thickening of the pleura.

5. *The tachycardial attacks.*—These were attacks of paroxysmal tachycardia, but their exact nature is difficult to determine. Electrocardiograms were taken during both attacks, but are difficult to interpret owing to the unsteadiness of the patient. The ventricular rate in the first attack was about 180 per minute, and in the second attack about 120. Right ventricular extrasystoles were fairly frequent on both occasions. It is difficult to decide whether the case is one of auricular flutter or not. The curve of the slower rate was against it. In view of the fact that at autopsy the heart was found to be surrounded by glands but not actually invaded, it seems most probable that the attacks were due to auricular paroxysmal tachycardia of either toxic or degenerative origin arising from a focus very near the sino-auricular node or from interference with the nervous mechanism of the heart by enlarged glands. Graber [2] has described an acute case of Hodgkin's disease (microscopically confirmed) in which attacks of paroxysmal tachycardia of the "auriculo-ventricular" type occurred. At autopsy the vagus nerves were found to be stretched and flattened over a mass of enlarged mediastinal glands. Microscopically they showed fatty degeneration.

6. *The suppression of urine.*—This was caused by strangulation of both renal arteries by the retroperitoneal mass in which they were embedded. The efflux of urine from the kidneys was not obstructed, since the ureters at autopsy admitted a probe which could be passed up to the pelves of the kidneys. The most remarkable points about this complication are the length of time (15 days) that the patient lived after the cessation of urinary secretion, and the striking absence of uræmic manifestations. In spite of the fact that the blood-urea had risen to 197 mg. per cent. two days before death, the patient's general condition deteriorated very little. Coma, convulsions, and muscular twitching were completely absent, and the appetite remained good and the mentality clear until the moment of death, which took place with dramatic suddenness. The length of time the patient lived with complete suppression of urine, though remarkable, is by no means exceptional. Myers [3] has collected 19 cases of anuria of from 20 to 29 days' duration, and refers to other reported cases of up to 60 days' duration. Scholl and Foulds [5] report a case of anuria and lay stress upon the absence of uræmic manifestations in cases of suppression of urine.

7. *The blood picture* shows a fairly constant mononucleosis of from 7·6 per cent. to 16 per cent., but the eosinophilia only amounted to 5·6 per cent. These are two of the features mentioned by Stewart [6] and others as characteristic of Hodgkin's disease and, though not in themselves diagnostic, appear to have some corroborative value in diagnosis. It is interesting to note that, on two occasions during the remission, the large hyalines decreased to 3 per cent. and 5 per cent.

SUMMARY.

The notable features of the case are as follows: (1) *Diagnosis:* Hodgkin's disease (confirmed by biopsy) of the "deep" type, with Hodgkin's sarcoma, and concurrent tuberculosis (possibly miliary gummata of the spleen. (2) The occurrence of a *remission* lasting a year accompanied by disappearance of some manifestations. (3) The occurrence of *chylous ascites* and *chylous hydrothorax*. (4) *Massive infiltration* of the pleura and peritoneum. (5) Two attacks of *paroxysmal tachycardia* due to sinus tachycardia, either of nervous or degenerative origin. (6) *Suppression of urine* of 15 days' duration with *latent uræmia* due to strangulation of the renal pedicles. (7) A marked *mononucleosis*.

I am indebted to my chiefs, the late Dr. F. W. Tunnicliffe and Dr. C. F. T. East, for permission to publish this case, and to Dr. E. ff. Creed for assistance in the preparation of the histological report.

REFERENCES.

1. Ewing, J.: Jour. Med. Res. (Boston), 1913, xxviii., 1.
2. Graber, V. C.: Amer. Heart Jour., 1925–26, i., 564.
3. Myers, W. A.: Jour. Amer. Med. Assoc., 1925, lxxxv., 10.
4. Scholberg and Wallis: Quart. Jour. Med., 1910–11, iv., 187, 196.
5. Scholl and Foulds: Jour. Amer. Med. Assoc., 1921, lxxvi., 368.
6. Stewart, M. J.: Brit. Med. Jour., 1921, i., 813.
7. Symmers, D.: Amer. Jour. Med. Sci., 1924, clxvii., 325.
8. ,, ,, : Ibid., 1924, clxvii., 175, 314.

# CLINICAL AND LABORATORY NOTES

## TREATMENT OF MALARIAL COMA.

By James Umansky, M.D.,

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The most dangerous complication of malaria in tropical and subtropical countries, apart from hæmoglobinuric fever, is coma. The hæmoglobinuria is more surely mortal, but is not so frequent, and therefore a successful fight against coma is the surest and most hopeful method of lowering malarial mortality. In my experience, this neurophilic localisation of the disease does not, like tertiary syphilis, affect patients with central nervous systems overtired from mental activity; but rather men with a feeble brain, not trained mentally, and perhaps poisoned by chronic alcoholism. This nervous complication of malaria presents a dreadful picture which can appear in various guises, but the most frequent and best known form is the comatose.

The coma may emerge in the course of an average case of malaria with the usual symptom-complex, or it may appear suddenly as the first manifestation of infection. When the coma is of moderate intensity, the patient is like one intoxicated by opium. When the coma is more severe, it presents the picture of apoplexy. The loss of consciousness and of sensibility is complete; the intestinal and urinary evacuations become involuntary, and the pupils are immobile. If the condition is not recognised and suitable measures taken, the result is fatal. In the majority of cases the coma is accompanied by hemiplegia or monoplegia at its onset and by amaurosis of longer duration. Sometimes the complications pass off spontaneously after several hours, but this happy issue is less frequent.

The central nervous system can also be affected with a convulsive, epileptic, or tetanic form of malaria. Sometimes cerebral localisation is shown by hemiplegia, paraplegia, aphasia, and other paralytic cerebral manifestations. Once I personally observed a stuporose cataleptic state.

### THE CAUSE OF COMA AND OTHER CEREBRAL SIGNS.

The post-mortem findings and clinical picture in the majority of cases suggests an anatomical basis, and only partially support a toxic origin. The onset of coma must be regarded as due to obstruction of the cerebral capillaries by infected erythrocytes. Several authors assume that there is no true obstruction, but an uninterrupted sedimentation of infected erythrocytes on the walls of the capillaries, which completely hinders the exchange of nutritive materials between the cerebral tissue and the blood. The theory of capillary obstruction is very nicely illustrated by the histological preparations of Da Rocha-Lima and Askanazy.

Other authors ascribe the nervous manifestation of malaria to toxæmia. It is impossible to exclude this when one considers the capillaries of the great splanchnic filters; the liver, kidneys, and spleen are filled with parasites in the stage of schizogonia and with detritus of destroyed erythrocytes. The mechanical effect of obstruction of the capillaries is the prevention of the physiological filtration of the blood. The detritus fragments in the canaliculi of the glandular system are much too large for the epithelium and cause great blockage. The end-result of the combined mechanical and chemical injury is the presence of toxic substances in the tissues.

### TREATMENT.

Tropical specialists recommend the intravenous injection of quinine, a dangerous therapy, which might

be justified by the desperate state of the patient. But I was warned by my colleagues to refrain from this heroic method, as they had witnessed fatal issues in all cases in which intravenous quinine was given. I am surprised that authors still recommend such a course. The supposed power of quinine to break up the obliterating and damaged erythrocytes in the cerebral capillaries is not actually beneficial. The liberated schizogonts can infest healthy erythrocytes and continue their deleterious effect on the brain.

My first four cases of malarial coma died, for I was a novice, and could do nothing to help them. At the fifth case I was struck by a new idea. Considering the encephalitic and meningitic varieties of malarial coma, I decided to try the administration of urotropine intravenously, in the hope of abolishing it. I remembered the power of this drug to pass the barrier of the cerebro-spinal fluid, so that it was recommended by pædiatrists and neurologists in the treatment of leptomeningitis. Recently Paul Rostock [1] wrote a monograph on the treatment of meningitis with urotropine, and on the various modes of its administration. I also took into consideration the capacity of this drug for elimination in the secretions of the liver and kidneys. The course of the drug is exactly that of the malarial parasite, and it should apply its bactericidal potency in just the necessary places.

I therefore injected into my fifth comatose patient 3 c.cm. of a 40 per cent. solution of urotropine, sterilised by a brief period of boiling. The effect was astonishing. All the serious cerebral symptoms began to evaporate slowly, and had completely passed off in three hours. The stuporose state in this and several more cases, and the convulsions in others, wholly disappeared. The pyrexia and the other signs of quiescent malaria, and the parasites in the blood, remained as in an ordinary case, thus showing that the urotropine does not damage the parasite directly. Its effect depends only on sweeping the capillaries of the brain and the secretory canaliculi of the liver and kidneys.

My own belief, which still needs direct experimental confirmation, is that the purification of the blood capillaries is brought about by the fixing power of the formaldehyde produced from the urotropine. This fixative potency raises the specific gravity of the damaged erythrocytes, hinders their adherence to the walls of the vessels, and facilitates their passage.

In this paper I have no intention of wearying the reader with reports of cases. I only wish to emphasise that all the symptoms of the comatose or convulsive state disappear after three to six hours, and that the patient becomes a normal malarial case with a mild course and favourable prognosis. I have observed this effect of intravenous urotropine in ten cases, all of which recovered from coma and eventually from malaria with the usual therapy.

SUMMARY.

In all cases of malarial coma, or any other acute involvement of the central nervous system in malaria, the intravenous injection of urotropine is the surest remedy to convert the severe state into a mild one. The urotropine exercises its salutary effect *loco dolenti*, in the cerebral capillaries and in the cerebro-spinal fluid, passing through the choroid and meningeal barrier.

My experience was gained four years ago, during an annual practice in the sub-tropical country of Tagykistan, at the city of Doshambe.

[1] Deut. Zeit. f. Chir., 1929, ccxvii., 264.

## PSYCHOSIS IN OSTEITIS DEFORMANS.

BY W. J. RUTHERFURD, *M.C.*, M.D. GLASG.

Dr. S. J. Hartfall's paper,[1] in which he upholds the rarity of mental symptoms in osteitis deformans, leads me to report the following case in which they were present:—

On Dec. 12th, 1925, a patient of mine, a man aged 62, sent for me. I found him in bed with the right thigh in plaster. He told me that he had fallen at his work 30 days previously, and had been taken to hospital with multiple fractures of the pelvis and of the thigh. He had come out with no evidence to confirm this diagnosis, and I had received no message about him from the hospital, on his discharge with his limb in plaster. I communicated with the hospital, and was informed that he had been admitted with fracture of the neck of the right femur (not of the pelvis at all), and that radiographic examination had revealed a condition of the bone suggestive of osteitis deformans.

A courteous letter (dated Jan. 11th, 1926) from the house surgeon went on to say:—

> "Further X rays of other bones were therefore taken (which I suppose led him to believe that he had multiple fractures), and these revealed changes in the skull, tibia, radius, spine, and pelvis, to a greater or less degree, and confirmed the diagnosis. Careful investigation of the history gave the stooping, pains in the back, and bowing of the legs, but not the increase in size of hats. . . .The ribs are, fortunately, not involved to any extent, and he gave no signs of chest trouble while here."

This man is still alive, and is now 71 years old. He is of low stature and shambling gait, with very definite bow legs. Of his two children, his son is in the ranks of the permanently out of work, and married after being a non-worker for many years; his daughter has exophthalmic goitre, and married an out-of-work labourer of peculiar disposition, who, shortly after marriage, took to his bed for no obvious cause, remaining there until he was removed to the mental ward of the local workhouse hospital in January, 1927. There he was certified, and was removed to the county asylum, where he has remained ever since. With a descending heredity such as this it is impossible to be certain that, in the absence of osteitis deformans, this patient would himself have kept free from mental changes on attaining his present age.

Brief notes were, from time to time, taken over the past six years, and these may, perhaps, be allowed to speak for themselves without the addition of any running comment.

Jan. 20th, 1926.—No albumin or sugar in urine.

March 16th, 1926.—Sends urgently for a special visit, but, when seen, refuses to say what he wants or how he feels, except for the reiterated phrase, "very low." Examination entirely negative.

July 19th, 1929.—Says he trembles from head to foot since his wife's death in May of the present year. (He had her attended by another doctor, by the way.) Only slight tremor of hands. Knee-jerks normal. Thickened radial artery.

Aug. 5th, 1929.—Says his condition is urgent, and that he feels "right down ill," but either will not, or cannot, supply particulars.—Aug. 13th.—Again complains of being "very ill." Says that he feels all right sometimes, but that, as soon as he gets to his work in the mornings, a feeling of illness comes over him. Later in the day is seen striding along in the street at 10 P.M., going in a direction away from where he lives.—Aug. 21st.—Comes for treatment outside surgery hours, saying that he is "very ill."—Aug. 29th.—Is strange in his manner and incoherent in his speech.

Sept. 6th, 1929.—Says that he often feels irritable and miserable.—Sept. 9th.—Brings back his medicine, complaining that it causes him to have palpitation.—Sept. 16th.

[1] THE LANCET, July 11th, p. 68.

—Says he is "downright ill with one thing and another." When asked what he means, he says that I have had him under my care for a good while now, and ought to know what is the matter with him without his telling me. I then ask him how he is feeling to-night, and his only reply is, "very poorly." A complete deadlock!—Sept. 23rd.—Will not take his medicine.

Oct. 21st, 1929.—Still complains about the way I am treating him. On its being suggested that he might care to attend the out-patient department of a local hospital, he says that he might get "better attention" there than I am giving him. He then suggests that I could, if I cared, do something more for him if he were a private patient than I am doing for him as a patient under the National Health Insurance.—Oct. 25th.—Has an inferiority complex with a delusion of persecution—the persecutor being myself.

Nov. 1st, 1929.—Appears with his National Health Insurance medical card in the surgery to-night, and asks for legal advice, saying that he "thought that I was a solicitor."—Nov. 4th.—Still haunts the surgery, and is obsessed with the idea that he is receiving inferior treatment because he is not a private patient.—Nov. 25th.—Says his medicine is "noxious," and refuses to take it. His objection is to its taste.

Dec. 2nd, 1929.—Has thrown his medicine away, although, to pacify him, he had been supplied gratuitously with a private supply.

June 26th, 1930.—Has a perionychia, and refuses to allow a septic bulla by the side of his finger-nail to be clipped away.—June 27th.—Has been tampering with his dressings.

Feb. 3rd, 1931.—Is still attending for treatment, complaining of all sorts of minor discomforts.

Aug. 9th, 1931.—Seen to-day, bringing the story up to date.

It is obvious that this man is in a perpetual state of vague discomfort; and at his age one almost feels tempted to promote euphoria by the use of one of the available habit-forming drugs. So long as he remains outside an institution it has seemed wiser not to adopt any such means of giving him comfort.

One records a history like this somewhat apologetically, in view of its obvious shortcomings. If, however, the subject is of importance at all it would seem justifiable to place such a story on record. It may also serve a useful purpose in reminding those who are apt to forget such matters of some of the real difficulties encountered in the every-day treatment of patients under the National Health Insurance Acts.

Manchester.

# BRITISH MEDICAL ASSOCIATION.

## ANNUAL MEETING IN EASTBOURNE.

### SECTION OF ANÆSTHETICS.

AT the first meeting of this section on July 22nd the chair was taken by Dr. H. P. FAIRLIE, and subsequently by Dr. LANGTON HEWER. A paper on the

### Progress of Anæsthesia

was read by Dr. R. J. CLAUSEN. The public, he said, believed that great advances had been made in anæsthesia during the last decade or two. Their flattery was hardly justified if their anæsthetic was ether or chloroform on a mask; the resources at the command of the anæsthetist had considerably increased, but full advantage had not been taken of them. The standard in the large teaching hospitals was probably fairly high, but there was at times an unfortunate tendency for some new technique to be used exclusively in the hospital of its origin. It was essential that the surgeon should realise the importance of the anæsthetist's work, as they could make little advance without his interest and coöperation. Routine anæsthesia might be bad anæsthesia, but a good deal of routine was necessary for smooth work. Any one anæsthetist's standard technique might make little difference to healthy patients undergoing short operations, but a large proportion of cases were not so favourable and needed special adaptation. There was a striking lack of regard for the patient as an individual. In hospitals he was often almost lost sight of. His pillow was removed, and he was left in great discomfort, flat on a metal-topped table, with only a thin blanket underneath him, just at the time when he should be made easy and comfortable. Post-operative backache, headache, and even chest complications, might be much reduced if every nurse were dressed and towelled for operation and laid on the table for an hour or two. A tendency sometimes appeared for the theatre to become a stage, on which the star performer displayed his skill, supported by leading lady, minor characters, and chorus, the anæsthetist being expected to supply the comic relief.

The mask and drop bottle were still employed far too often; their use should be limited to induction. Open ether had been described as a method invented by amateurs for amateurs. Local, regional, and spinal methods were not as fully used as they might be, nor were the advantages of gas, notably ethylene, exploited adequately. The gas apparatus available in England had tended to hinder the effective adoption of the method. People complained that the modern apparatus was too complicated; but they did not make that complaint of their motor-cars.

Wherever possible, in major or minor surgery, gas-oxygen should be preferred to ether alone, and, when circumstances did not forbid, ethylene should replace nitrous oxide. The fullest use should be made of combined methods. Ethylene was little more liable to explosion than oxygen-ether. For long oral operations intubation was necessary, but endotracheal insufflation was not to be recommended. The necessity for adequate premedication was not fully realised; morphia was essential in gas-oxygen, and no patient should come to operation without preliminary sedatives. Carbon dioxide and intravenous glucose should be more widely used. There was a striking lack of any serious attempt to investigate the problems of anæsthesia by means of observations on large numbers of cases. There was a considerable personal equation in inhalation anæsthesia—hence the wide diversity of agents, apparatus, and techniques, all with good results.

The reasons for the shortcomings of anæsthesia, said Dr. Clausen, were traditional and economic. Hospital and national customs died hard, and hospitals and anæsthetists alike could ill afford expensive modern apparatus. Nursing homes were often entirely devoid of equipment; consequently portable and simple—even crude—apparatus was used. Progress could only be achieved through the recognition by all concerned of the importance of anæsthesia as a subject. Its status must be maintained and improved. The standard of asepsis must be as rigid as possible. The position of the anæsthetist as a specialist must be made secure, and his services fully utilised in all cases. The demon of hustle must be exorcised, and the tyranny of long lists broken.

#### DISCUSSION.

Dr. K. B. PINSON spoke strongly in favour of ethylene, commenting on the absence of shock and after-effects. It was not potent enough to control some patients, and ether might have to be added. Attendants complained of the smell, but the patients never did. He used the nasal method, giving nitrous oxide, oxygen, and ethylene in sequence, and had

kept patients under for more than an hour without ill effects. He had given up nitrous oxide as being too troublesome, but the new method of nasal intubation was simple and certain, and gave the method a fresh impetus. Endotracheal nitrous oxide gave great control of the patient. It was urgently necessary to abolish nursing homes, and treat all patients in hospital.

Dr. H. W. FEATHERSTONE claimed that progress had been made in many directions, and that the best method was chosen for each case. The need to consider the anæsthetic from the patient's point of view grew steadily in importance; the patient's comfort must be insisted on in every way. Experience of general practice was invaluable for an anæsthetist. He recommended a close-fitting rubber face-pad as a precaution against burning. Local, regional, and spinal anæsthetics should be more and more used. In America the demonstration of their case to a large class was taken as a matter of course, even by the wealthiest patients; this helped the progress of local and regional work.

Dr. ROSS MACKENZIE pointed out how much the choice of anæsthetic depended on the surgeon; more complete coöperation was, he said, essential. The best results could not be obtained if the anæsthetist met the patient for the first time in the theatre. If expert anæsthesia were found to hasten convalescence it would become of financial importance. Preliminary atropine helped to prevent cardiac inhibition. All the members of the team should recognise the importance of individual preparation and the danger of routine.

Dr. BESSIE COOK emphasised the varying attitude of surgeons, and the common fallacy that "anybody" could give anæsthetists. S. R. Wilson had said that anæsthetists, like accompanists, were only noticed when they performed badly. She compared 500 cases given chloroform and ether by a house surgeon and 500 given gas and oxygen from a McKesson machine. The death-rates were 6 per cent. and 4 per cent. respectively; 43 per cent. were not sick with ether and 53 per cent. were not sick with gas. The worst risks had been left for the "gas" days. There was an average of two days less in hospital for gas, and the staff were unanimous in favour of gas.

Dr. LANGTON HEWER confessed that towards the end of the day most anæsthetists tended to callousness, and forgot the tremendous importance of the operation to the patient. The only remedy was curtailment of long lists. Anæsthetic rooms needed improvement. They should have absolute quiet, and as little resemblance to a theatre as possible. Coöperation was still more often discussed than acquired. Perhaps the anæsthetist's most difficult responsibility was in advising a surgeon when to stop. The surgeon should have absolute trust in the anæsthetist, who must show himself worthy of the trust. A man who wished to give safe anæsthesia must devote his whole time to the subject. In the past few years there had been four notable advances: the greater use of gas and oxygen, the wide use of basal narcotics, the introduction of percain, and the use of carbon dioxide.

Dr. A. H. MACKLIN agreed that the anæsthetist must be skilled, and spoke warmly in favour of gas and oxygen for suitable cases. It was undoubtedly possible to secure adequate anæsthesia with gas, even in high abdominal operations. The advantages were very great. To secure adequate relaxation it was essential to introduce an asphyxial element; blueness with gas was a very different matter from blueness with ether and chloroform. All gas-oxygen apparatus must allow absolute and instant control of the asphyxia. Surgeons must be educated to realise that blue blood did not necessarily mean congestion and increased bleeding. The education of the surgeon was the first step in improved anæsthesia. A method that poisoned every cell of the body could not be regarded as ideal for a local operation; local anæsthetics must be more studied.

Dr. E. W. STRANGE objected to morphia and urged large doses of atropine instead.

Mr. A. W. ADAMS said that he had heard that the McKesson apparatus was being superseded in America.

Dr. CLAUSEN in reply, emphasised again the ludicrous lack of statistical investigations. Without such a support the surgeons and hospitals could not be convinced. The aim of premedication should be sedative, not stimulant. Different apparatus was probably used in different parts of America, and individual expressions of opinion might only reflect local fashions.

The CHAIRMAN thought it was a mistake to belittle the explosibility of ethylene, although explosions were very rare in this country.

Dr. W. HOWARD JONES read a paper on

## Subarachnoid Block.

He began by describing the anatomy and physiology of the arachnoid and its spaces—on which understanding of the method depended—and discussed some fallacies, concluding that gravitational diffusion was an inaccurate, wasteful, and uneven method. The danger of intrathecal administration lay not in a vasomotor effect from a regional block of the thoracic and lumbar roots, but in blood absorption and paralysis of the vasomotor centre. The respiratory centre might be paralysed by an overdose in the blood. The patients were in a state of "hibernation" with every function depressed to its lowest level and respiration only just sufficient for life.

The alternative to gravitational diffusion was to inject the drug by a syringe, using the cerebro-spinal fluid as a vehicle. If a foreign fluid was used either it was hyperbaric and gravitational diffusion followed, or it was isobaric or hypobaric and no spread followed. Novocain could not be used because it produced a hyperbaric solution with cerebro-spinal fluid. Percain up to 3 c.cm. of a 1/200 solution in acidulated distilled water would apply equal concentration to both anterior and posterior roots, giving good relaxation and an analgesia that outlasted paralysis. The disadvantages were that the withdrawal of fluid was troublesome and the mixture might produce precipitation of the percain. The simplest method was direct injection, without previous withdrawal. A unilateral result could be obtained by putting the patient on his side. Ventral decubitus should be used, for in dorsal decubitus the hypobaric solution tended to apply itself chiefly to the anterior roots and might give paralysis without analgesia. Hyperbaric solutions tended to give poor relaxation. Intradural caudal block required stronger solutions because the trunks were more resistant than roots.

It was an old fallacy that patients too bad for a general anæsthetic could be given a spinal. Only a sound heart would resist the profound fall in blood pressure, which ephedrine might relieve but could not prevent. Percain undoubtedly extended the use of limited block in poor risks. High thoracic block found its best application in men who were "too strong" for a general and would need harsh

anæsthesia to give relaxation. On the other hand, spinal anæsthesia was not excluded in bad risk cases, for the post-operative risks of other forms of anæsthesia might be worse. No rule could be made. For head operations the method could not compare in safety with good gas intubation.

DISCUSSION.

Dr. H. K. ASHWORTH said that in his experience stovaine could not be made to move at all, ten minutes after injection, by tipping the table; yet is was very slowly absorbed. He did not agree that gravitational diffusion was wasteful and uneven. The simplicity of the technique was a great advantage. Accurate control with hyperbaric solutions was very difficult unless the table could be kept quite level. He had heard no complaints from surgeons. The only disadvantage was that anæsthesia would not last more than an hour. Disasters, he agreed, could be traced to central and circulatory depression. He gave morphia and ephedrine half an hour or forty minutes before operation. In quiet cases consciousness was the great objection to spinal anæsthesia. The immediate and remote nervous sequelæ were by no means negligible. Headache was the most tiresome and obstinate and occurred after all techniques.

Mr. T. P. DUNHILL said that comfort for the surgeon meant safety for the patient. He used spinal anæsthesia for high abdominal operations, which always gave trouble afterwards if other anæsthetics were used. Admittedly, there was sometimes headache, nausea, or a little difficulty in sewing up, but the advantages were great ease of work and complete relaxation in the beginning. The patient could breathe deeply and thoroughly as soon as the operation was over.

Mr. BASIL HUGHES agreed that the ideal spinal analgesia should be secured by a drug in the greatest possible degree of dilution. The symptoms following heavy compounds were the effect of absorption and not of diffusion. A very large number of factors interfered with the pressure of the cerebro-spinal fluid; there was no such thing as stasis, but the normal pressure was not re-established for some time after interference. The specific gravity of the drug injected was not that of the fluid, and therefore it sank when injected. Since the normal fluid density varied from 1002 to 1010, anomalies must be expected. He had found that the high tide was most easily obtained with stovaine, and if anæsthesia was not complete in ten minutes it never would be. It was the anæsthetic of choice for high abdominal work. He could not obtain analgesia above the umbilicus with 2 c.cm. of spinocain. He did not find that dosage bore any relation to the body-weight; the tragedies had occurred in big, heavy patients. Spinal anæsthesia was a block; that was the whole point. No man was "too strong" for a general anæsthetic. The shock was the surgeon's difficulty. Hot-water bottles should never be used after spinal anæsthesia. A combination of spinal anæsthesia and avertin was perfect; the avertin saved any psychic shock.

Mr. DICKSON WRIGHT deprecated the practice of turning the patient on his face and recommended absence of all fuss and bother. He did not think that the fall of blood pressure was due to absorption of novocain; he had done experiments to show that it was due to a number of factors, particularly the sympathetic supply through the cervical nerve-roots. The upper abdomen was supplied by the tenth cranial nerve and third and fourth spinal nerves and was therefore a very difficult area for spinal analgesia. Hæmorrhage was very badly borne by these patients but could be overcome by ephedine. Horner's syndrome indicated a satisfactory anæsthesia. The rise of temperature produced was a measure of vaso-spasticity. Rectal and vaginal operations were aided by the relaxation of the leavator ani. Spinal analgesia was the factor that was going to reduce the grave mortality in intestinal obstruction. It was also valuable for operations on the lower limb. He preferred it to general for urgencies, rectal, bladder, and gynæcological operations, operations on the thorax, and some on the head and neck. The only absolute contra-indications were epidemic cerebro-spinal meningitis in the institution, sepsis of the cerebro-spinal fluid, perforation of the intestine, and increased intracranial pressure. It required less skill than general anæsthesia; it was safe and made for easier convalescence.

Mr. ADAMS said that spinal anæsthesia was undoubtedly superior to other methods in deep surgery of the abdomen. Its safety depended on technique and on the case. Below the umbilicus it was as safe as ether. Danger lay in neglect of caution due to familiarity. He doubted whether harm from novocainæmia was as frequent or important as Dr. Howard Jones believed. The certainty of spinal anæsthetic depended on the case. The upper abdomen was a dangerous borderline. No anæsthesia could eliminate the costal margin, which troubled the surgeon more than muscular rigidity, but on the right side, where the liver formed an effective protection to the chest, spinal anæsthesia was justified.

Dr. FAIRLIE said that percain undoubtedly gave a freedom of action in the upper abdomen which was hard to obtain otherwise. It had enormous advantages in intestinal obstruction, and was also useful in infants. There was such a tendency to restlessness that he liked to have gas and oxygen available. He had had rather a high incidence of post-operative complications, but the absence of headache with percain had been striking.

Dr. LANGTON HEWER thought that Dr. Howard Jones' technique was a great advance, but did not think an injection between the first and second lumbar vertebræ was uniformly safe, and now used a lower site with a larger quantity of fluid. He described a case of widespread paretic effects which he ascribed to partial injection of percain into an abnormally low cord. He did not think spinal analgesia could compare in safety with other methods for operations above the diaphragm.

Dr. HOWARD JONES, in reply, maintained that gravitational anæsthesia was not uniform and left the strong solution in the cauda equina where it was not wanted. The drug should be put directly where it was wanted. For big men 1/1000 percain would be quite suitable, but for short operations 1/2000 was to be used. One solution would never be applicable to all kinds of cases.

## SECTION OF OPHTHALMOLOGY.

Mr. E. E. MADDOX presided over this section. At the meeting on July 22nd Mr. M. S. MAYOU read a paper on

### Ophthalmia Neonatorum.

He said his experience of ophthalmia neonatorum was gained largely at the special hospital, St. Margaret's Hospital of the London County Council. The notifications during the last 15 years had not

decreased at all. During the first three years four children were discharged each year blind in both eyes. During the whole of the rest of the time only four children were discharged blind. 20 per cent. of children in the blind schools had lost their sight following ophthalmia neonatorum. Midwives were trained to recognise the disease, but medical students did not get the same opportunities. Often drugs were used in much too concentrated a form through lack of knowledge among medical men. The lids of new-born infants were normally closed at birth by meibomian secretion, but xerosis bacillus was found at the fourth day. The conjunctival epithelium was very thin at birth and the fornices had no lymphoid tissue. If silver nitrate or other irritant was applied at birth lymphoid tissue was produced in 48 hours. In ophthalmia neonatorum the gonococcus was present in about 65 per cent. of cases; 10 per cent. of cases showed no organisms; other organisms might be streptococci and *B. coli*. The attack might vary in the two eyes since the conjunctiva in each developed an independent local immunity for itself; relapses might occur independently in the two eyes. The duration of the disease might be as long as three months when immunity is low. Dacryocystitis was the only condition which was liable to be mistaken for ophthalmia neonatorum. Occasional mistakes in diagnosis had been due to such rare conditions as necrosis of the upper jaw and even fractured base.

The treatment was constant irrigation with cold lotion, since cold inhibits the growth of the gonococcus. Eusol 1–10 made a good lotion if not too recently prepared. After each irrigation the conjunctival sac was filled with acriflavine 1–1500 in castor oil. The nurse charted the amount of discharge found at each irrigation. Silver nitrate helped to clear the discharge towards the end of the attack. General treatment was as important as local. Debilitated children were more likely to get corneal ulceration. If possible the mother should be admitted to breast-feed the child. A valuable treatment was to nurse the children in open-air wards. Vaccines and milk injections were extremely dangerous, since they lowered resistance and might cause corneal ulceration. 90 per cent. ulcers formed in the lower third of the cornea. Ulcers sometimes perforated early, particularly in fairly healthy children. Larger ulcers were associated with bad health. In the worst cases the cornea might slough and the lens extrude itself. The lens always came out in its capsule. These cases were often followed by secondary buphthalmos. The gonococcus never caused panophthalmitis. If an optical irridectomy had to be performed it should be done outwards or inwards, with slight inclination upwards. Gold chloride was useful to diminish the halation from the nebula. In the presence of buphthalmos, Mules' operation was often advisable. General complications were rare, and included arthritis and endocarditis.

Mr. H. HAWARD BYWATER emphasised the importance of institutional treatment, including the taking of the mother into hospital. His Liverpool experience dated from 1908 at St. Paul's Hospital. Midwives notified these cases to the health authority; trained nurses were appointed to visit cases. If the doctor agreed these cases were taken to hospital. The average stay in hospital was 18½ days, and the cost of treatment £2 12*s*. per week for mother and baby. Mr. Bywater suggested that obstetricians might do more to disinfect the maternal passages before birth. For the eye he recommended an irrigator which could be used to retract the lower lid at the same time.

Dr. W. H. CRISP, of Denver, Colorado, wondered whether hot applications might not be better than cold.

Miss MARION GILCHRIST considered that parents should be examined for gonococci long before the birth of a child was expected.

Mr. MAYOU, in reply to questions, said his patients had an average stay in hospital of five weeks. He did not think that hot applications could be applied sufficiently hot to do much good. He disliked the old operation of tattooing, since he had seen the development of sympathetic ophthalmia in one case. As prophylactic treatment, he recommended acriflavine 1 in 1500 in castor oil rather than silver nitrate. Adult corneal complications were more severe than infantile, since the blood-supply was less efficient and discharges accumulated round the limbus in a sulcus of swollen conjunctiva.

A resolution was proposed and forwarded to the Council of the B.M.A. for approval, suggesting that the General Medical Council should make it compulsory for medical students to pay at least one visit to a special hospital for ophthalmia neonatorum during their training, the best time being during the course in fevers.

Mr. ARNOLD SORSBY in his paper on

### School Myopia

said that this problem was the problem of the development of myopia as a whole. The most important contribution made during the present century was that of Steiger, who considered hypermetropia, emmetropia, and myopia a continuation of the same unbroken process. Long and short eyes, like tall and short individuals, were variations from a common mean. The curves of statistics of large numbers of refraction cases were not truly binomial; but a binomial curve was obtained if diseased eyes were excluded. Mr. Sorsby suggested the division of myopia into two types—one being a physiological variant, the second pathological. Tron, Vogt, and others had thrown doubt on the hypothesis that myopia is simply a question of the axial length of the eye. An eye of +4 dioptres might have the same axial length as a −6 dioptre eye from different curvatures of the various refracting surfaces. Many so-called pathological changes in myopic eyes were developmental in origin, possibly hereditary-determined characteristics. During school life the hypermetropic eye was stationary and the myopic eye tended to progress in degree. This broad statement had many exceptions. Most school myopia became manifest at about the age of 12. Theoretically, the growth of the eye was thought to be complete at 8 years. Why, asked Mr. Sorsby, should there be in certain children a readjustment of axial length or of the position or strength of the refractory media? An extensive study of myopia in its breeding ground—the schools—should be undertaken, especially the study of premyopic condition.

Mr. BISHOP HARMAN said that myopia is a most difficult problem. He did not think it was increasing in proportion to the number of school-children. In London 1 in 1800 children with myopia had to be dealt with in special schools.

Mr. INGLIS POLLOCK suggested that one factor was reading in bed after illness in predisposed children.

Dr. C. G. SCHURR thought that general health

undoubtedly affected the menace of myopia. Prenatal health of the mother could affect the degree of myopia. He instanced a family in whom two myopic children followed a maternal illness, whereas the others were emmetropic.

Dr. W. H. CRISP mentioned that myopic children read more, since they were withdrawn from sport. He pointed out the high proportion of myopes in Germany, where the type in which books were printed was difficult to read.

Dr. E. E. MADDOX said that the shape of the head was connected with the shape of the eyes. Long eyes might occur in long heads. He thought calcium internally was good treatment. Adolescents made many more calls on their calcium than adults. He paid attention to the tension of myopic eyes, and occasionally prescribed pilocarpine.

In reply, Mr. SORSBY said most of the work on myopia was based on insufficient statistics. In 40 years' time more statistics would be available. He hesitated to correlate myopia with general conditions or cranial configuration.

Mr. N. BISHOP HARMAN read a paper on the

### Eyesight of Motor Drivers.

The new Road Traffic Act enforced a minimum sight test. He pointed out that bad sight did not necessarily cause accidents. A man nearly blind with optic atrophy drove some years with a child to direct him, though he eventually came to grief. Danger was due to lack of road sense and often to over-confidence. The L.G.O.C. in rejecting drivers found that many rejected persons were unaware of defective vision. Ability to read a number-plate at 25 yards should not be considered apart from field of vision. A driver should be able to see a pedestrian and observe his actions; but even 6/9 vision might be useless if there is no peripheral vision. Even 20 per cent. loss of field of vision was dangerous to a driver. He thought good binocular vision helpful to a good driver, although one-eyed men could sometimes do well. Cars had been driven at 100 miles an hour by drivers with one eye bandaged. He himself would not employ a one-eyed driver. The difficulty often found in reversing by drivers was due to one eye only being used. A one-eyed driver with a Wellingtonian nose was definitely unsafe. A fair test was the driver's ability, or lack of ability, in playing moving ball games, such as tennis. Another factor to be remembered was that some people have defective light sense, and though safe in daylight were dangerous at night. Defective colour vision caused confusion in the interpretation of signals. Signals should be given by lights of different shape rather than colour. Many accidents were due to defects in reaction time and defective attention. Fatigue changes were more manifest in crowded traffic. Professional drivers needed a higher standard of vision than private drivers, since they were more liable to fatigue and difficult conditions.

Dr. E. S. PRIMROSE stressed the importance of a reaction time test, light and dark adaptation, and some form of psychological test. He emphasised the danger of dazzle from headlights.

Mr. M. S. MAYOU said he had seen an accident definitely due to a one-eyed motor cyclist.

Mr. LARKING pointed out that there should be some standardisation of the charges made for signing certificates of visual acuity.

The section supported a resolution protesting against the exclusive use of coloured lights for signals on the roads. Signals should differ in shape as well as in colour. This resolution was forwarded to the Council of the B.M.A. for confirmation.

Mr. E. W. BREWERTON in his paper on

### Sclerectomy and its Dangers

said he found a Bowman's canaliculus knife useful in completing the removal of Descemet's membrane from the trephine hole. In trephining he made the hinge to the disc away from the cornea. Loss of aqueous tumour might be due to irregularity of the trephine edge or to tilting the trephine too far forwards. He emphasised the importance of removing all Descemet's membrane. Faulty filtration might sometimes be assisted by massage of the eye. Tension might rise again if the hole got blocked by uveal tissue. This was due to trephining too far back. Hæmorrhage during the operation must be avoided. If cataract formed in an eye with an adequately leaking trephine hole he made his section for extraction in the cornea in front of the trephine hole.

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## SECTION OF LARYNGOLOGY.

AT the first meeting of this section, with Mr. W. M. MOLLISON, the President, in the chair, a discussion on

### Sore-throats of other than Tonsillar Origin

was opened by Mr. BEDFORD RUSSELL, vice-president. There was need, he said, to emphasise the often neglected importance of the nasal sinuses in producing sore-throat, faucial as well as pharyngeal. Tonsillectomy sometimes failed to cure or prevent sore-throat, which suggested that the tonsillar inflammation was often conditioned by infections overlooked in the sinuses. This relationship between nasal and tonsillar infections made it appear that the tonsil was merely fulfilling its proper function of inflaming in response to infection in the nose; a sort of watch-dog function which it was surely ill to reward by extirpation of the watch-dog. Treatment of any sore-throat should be preceded by preliminary investigation to ascertain the type of sore-throat that it was. A gentle nasal lavage after shrinkage of the mucosa would clear up many cases. It was occasionally necessary to resort to drainage of the antrum, and that was no longer the terrible affair of pre-war days, when anything short of the Caldwell-Luc operation was considered not to be thorough. He asked for support in recommending early drainage of the antrum for persistent infection without waiting for the development of an empyema—drainage to consist of a small permanent opening via the inferior meatus.

The PRESIDENT referred to the importance of the subject, for, he said, there was no doubt that tonsillectomy frequently failed to relieve the symptoms. Chronic sore-throat, due to causes other than tonsillitis, was a cause of difficulty in diagnosis and in treatment.

Mr. J. B. HORGAN mentioned dental sepsis, fibrositis of the muscles of the fauces, and neuroses as causes which occasionally baffled diagnosis.

Mr. J. F. O'MALLEY said that any infection in the nose was a frequent cause of pharyngeal pain. It was not generally recognised that nasal obstruction alone might be a cause of pain in the throat, either directly as a result of the obstruction, or indirectly owing to the predisposition to sepsis which the obstruction caused.

Mr. E. D. D. DAVIS drew a sharp distinction between the cases in which sepsis was intrinsic in the tonsil

and those in which the infection reacted from a sinus or infected teeth.

Mr. HERBERT TILLEY said that pain might be due to swelling of a band of tissue behind the tongue, which was red and raised, and in his opinion was not always due to sepsis.

Mr. C. A. SCOTT RIDOUT considered that this band was a frequent cause of pain, but thought it due to sepsis. Sometimes an anatomical peculiarity, such as a long styloid process, predisposed to pain.

Mr. H. V. FORSTER, Mr. J. A. GIBB, and Mr. LOWNDES YATES also spoke; and Mr. BEDFORD RUSSELL replied.

Mr. MUSGRAVE WOODMAN opened a discussion on the

**Treatment of Carcinoma of the Œsophagus.**

He considered first the reason of the total failure of our present means of treatment to effect a cure, and pointed out that this in part depended on the free anastomosis of lymphatic channels in this region, and in part on the mobility of the œsophagus, which limit the formation of a zone of adhesions adequate to prevent the spread of sepsis from the lumen of the gullet to the thorax. In cases in which the cancer was limited to the cervical part of the œsophagus, he advocated its excision. In patients in whom the cancer lay within the thoracic segment of the œsophagus, he condemned all methods which demanded opening of the thorax as being too severe for these debilitated patients. For cancers of the thoracic segment, he advocated diathermy, on the grounds that it was a painless operation, which increased the lumen of the gullet and gave an increased ease of feeding, although it never cured. The interstitial application of radon, he thought, had failed, because the upper portion of the growth alone was treated. The central implantation of radium was the treatment that he advocated. He attributed part of the failure to secure more fortunate results to the irritation of the metal tubes in which the radium was carried. He had therefore caused to be made tubes of soft rubber. These he showed, and later, in discussion, members expressed approbation of their design.

The PRESIDENT voiced the feeling of the meeting in expressing their regret that Sir Charters Symonds, the pioneer of treatment of œsophageal cancer, could not take part in the discussion. Mr. Mollison agreed with Mr Woodman that diatherm,y would not cure, but it relieved dysphagia. He advocated gastrostomy, and had knowledge of an exceptional case in which dysphagia due to œsophageal carcinoma was relieved, and the patient swallowed comfortably till he died of a recurrence five years later.

Mr. SCOTT RIDOUT gave details of a case in which a great regression of a growth had taken place. He also advocated gastrostomy, which he does as a routine under local anæsthesia.

Sir JAMES DUNDAS-GRANT advocated early gastrostomy. He referred to perforations of the œsophagus after using radium, and thought that Mr. Woodman's tubes would go far to diminish their occurrence.

Mr. DAVIS stated that the radium results were worse in œsophageal cancer than in any other site of carcinoma.

Mr. WOODMAN, in reply, said that although treatment by radium held the field to-day, diathermy should not be given up, for, after its employment, the patient often swallowed better than after any other form of treatment. He believed in small amounts of radium at a considerable distance from the growth. Large doses gave bad results. He disagreed with the performance of gastrostomy as a routine. He had used it largely in the past, but now had almost dropped it, for he found that the mental effect upon the patient was so bad.

Mr. HORGAN read a paper on

**Development and Anatomical Peculiarities of the Upper Jaw**

in Relation to the Surgery of the Nasal Sinuses. He referred briefly to the work of Keith and Campion on the development of the upper jaw, and emphasised their bearing on the conventional forms of operation for chronic nasal sinus disease. It was on the points brought out in this work that he based his belief that the most adequate line of approach to the antrum, ethmoidal, and sphenoidal sinuses was by the canine fossa route.

Mr. BEDFORD RUSSELL suggested that the transantral route of attack on the ethmoids had a good deal to recommend it. It formed, in his opinion, one of the few examples of cases in which it was better to open the antrum from the mouth in preference to the nose.

Mr. O'MALLEY said that he had never tried the method which Mr. Horgan advocated, and was personally satisfied with the methods of approach by intranasal routes.

Mr. TILLEY considered that antral inflammations could be divided into two—namely, the isolated antra, with a localised infection in which he advocated drainage by the intranasal route, and, secondly, the cases in which general polypoid degeneration of the nasal and antral mucous membrane had taken place. In these the buccal route was, he thought, preferable.

Mr. FORSTER recommended the intranasal route for opening the antrum, and found that local anæsthesia was adequate for the purpose.

Mr. GIBB spoke of the importance of preliminary intranasal medication before the operation, and Mr. Horgan replied.

Sir JAMES DUNDAS-GRANT read a paper on

**The Nasal Element in Spasmodic Asthma,**

in which he advocated treatment of the nose, which was frequently the peripheral source of the hyperexcitability of the vago-accessory nucleus. He pointed out that other conditions, such as a susceptibility to foreign proteins, a peripheral stimulus from some other region than the nose, or psychic disturbances, also caused hyperexcitability of this centre, and stressed the need of careful differential diagnosis of the cause of asthma. He considered that the nasal element was an important one in asthma, in support of which he cited the commonness of nasal abnormalities in cases of asthma, the improvement following the removal of these abnormalities, the return of the asthma when the nasal abnormality recurred, and the lessening of the hypersensitiveness to the foreign protein after nasal treatment. He found that when the asthma was of nasal origin the lesion generally lay in relation to the upper and back part of the septum. Operative treatment in children gave, in his opinion, specially good results.

Mr. BEDFORD RUSSELL cited examples of difficulties that might arise in diagnosis.—Mr. C. A. B. HORSFORD advocated that operation should be of a thorough nature, or it would fail.—Mr. HORGAN spoke of maxillary and ethmoidal sinusitis as a cause of asthma.

# REVIEWS AND NOTICES OF BOOKS

**Medical Jurisprudence.**

Third edition. By ELMER D. BROTHERS, B.S., LL.B., Member of the Chicago Bar. London: Henry Kimpton. 15*s*.

**Legal Medicine and Toxicology.**

By RALPH W. WEBSTER, M.D., Ph.D., Clinical Professor in Medicine, Rush Medical College, University of Chicago. London: W. B. Saunders Co., Ltd. 37*s*. 6*d*.

**Medical Jurisprudence and Toxicology.**

Fifth edition. By JOHN GLAISTER, M.D., D.P.H., F.R.S.E., Professor of Forensic Medicine, University of Glasgow; and JOHN GLAISTER, Jun., M.B., Ch.B., M.D., D.Sc., J.P., Professor of Forensic Medicine, University of Egypt. Edinburgh: E. and S. Livingstone. 30*s*.

**Recent Advances in Forensic Medicine.**

By SYDNEY SMITH, M.D., M.R.C.P., D.P.H., Regius Professor of Forensic Medicine, University of Edinburgh; and JOHN GLAISTER, Jun. London: J. and A. Churchill. 12*s*. 6*d*.

Two of this important series of medico-legal text-books take origin from the University of Chicago. Mr. Brothers' volume is written by a lawyer for doctors, and aims at being little more than an exposition of the law of the United States as it affects the medical practitioner. The medical sections are, indeed, so antiquated that one might easily overlook the merits of a work which contains a large amount of valuable information in a small space. The student of forensic medicine will note with interest how closely the American courts have kept to the English in developing the legal principles from which both systems derived. In some respects American courts appear to be harsher to the doctor—e.g., in awarding damages for negligence or for unauthorised operative interference. On the other hand, our American colleagues escape more lightly in actions for breach of professional confidence. An important difference has arisen in respect of the law of insanity. The doctrine of the "uncontrollable impulse," still regarded here as a heresy, has been accepted in most States of the Union. Laws against abortion also show deviations, for in some States it is not held to be a crime unless the woman has quickened, and in all statutes dealing with the subject explicit exemption is granted in cases "where premature delivery is necessary to save the mother's life." This statutory protection for therapeutic abortion (unknown to English law) has had a curious effect. The majority of courts hold that the onus is now on the prosecution to prove the *absence* of a medical necessity for the operation, with the result that the law is, in practice, almost a dead letter. It is consoling to observe that America is struggling, like ourselves, with anachronistic laws on Sunday observance—but, again, with a difference. We forbid recreation on the Sabbath Day, and they forbid work. The doctor, one learns with mingled feelings, is considered exempt from these restrictions.

More ambitious in scope is Prof. Webster's new text-book. The writer's personal interests appear to be mainly concerned with chemistry and toxicology, and these subjects have been allowed to occupy more than half a text-book which professes to cover the "usual phases of legal medicine." They are fully and competently treated, and the section on alcohol is particularly useful. It contains much important information about the effects of prohibition, and good descriptions of alcoholic poisoning. Certain important branches of medical jurisprudence are inadequately handled; with the result that the value of the book to students is much impaired. The section on "wounds and injuries" devotes only a few lines to "regional wounds" and little more to hæmorrhage. On the all-important subject of medico-legal autopsies and reports, the author blandly observes, "we have nothing to say, as we prefer to refer for such details to the articles of Helstoen, Le Court, and Lorries." In this volume of 830 pages there are only 49 illustrations, and of these only one (a badly smudged reproduction of finger prints) is original; the remainder are taken from well-known text-books. More surprising is the entire absence of original case material from a book which is remarkably well documented and rich in references to current literature. Unless Chicago has been cruelly maligned, a magnificent opportunity for practical research has been neglected.

Prof. Glaister's familiar text-book is conspicuously strong at the points where Prof. Webster's is weak. The section on post mortems and reports is in the best traditions of the Scottish schools, which have always grounded their students well in these important respects. The chapter on finger-prints is a treatise in itself, not to be equalled in any similar text-book. The greatest strength of the book, however, lies in the unique mass of case material which the elder professor has accumulated in a long career in Scotland, and which his son has more recently enriched from Egyptian experience. Details of recorded cases are particularly valuable to the medico-legal expert, who has to work out relationships of cause and effect in obscure circumstances, with, perhaps, a man's life hanging on his estimate of probabilities. Here we have in detail the stories of classic crimes, with their morals made clear for future generations of experts. In the section on toxicology, the tests are well described and the information is up to date. It is difficult to run such diverse legal systems as those of England and Scotland in double harness in the confines of one volume; and it cannot be said that the authors have always been entirely successful. The section on incest, for example (p. 518), leaves the English law on the subject in considerable doubt. The legal age for marriage is incorrectly stated on p. 437. The most serious defect, however, is the absence of all mention of the Mental Deficiency Act, 1927, and the Mental Treatment Act, 1930, an omission which renders the chapters on these subjects misleading to English students. In a future edition some of the luxuriant growth of minor case records might well be pruned to make room for more up-to-date references to legal enactments and decided cases. With the medical aspects of their subject the authors have kept well abreast.

The small and modestly named volume presented by Profs. Sydney Smith and Glaister, Jun., is in reality a collection of valuable monographs on some of the most difficult problems confronting the medical jurist. Its very technical character will make it useful to Sherlock Holmes rather than to Dr. Watson, but its lucidity of style should enable even the cross-examining barrister to pick up invaluable hints. The amount of detailed learning on the examination of projectiles, of powders, and of weapons is astonishing. Full tables are given, showing particulars of every

English and foreign make of weapon and of powder. A chapter on the identification of hairs is beautifully illustrated, and a good description is given of the technique of their examination. The authors advise caution in identifying age and sex by hair alone. There are chapters on the medico-legal use of spectroscopy and ultra violet light. The use of the precipitin tests is assuming increasing importance in medico-legal work, and the technique, of which the difficulty is rightly emphasised, is well described. The authors conclude :—

"It appears that blood-grouping tests have a definite medico-legal value, but, owing to the preponderance of two of the groups over the others, their value is limited. The greatest value lies in the negative character of the results in many cases—namely, that the blood-group of the child clearly indicates that it could not be the offspring of the alleged parents, and permits an examiner to say with certainty that a particular individual could not possibly have been the father of the child."

In Germany and Austria the lower courts have recognised in about a thousand cases the value of evidence based on a blood test for fatherhood; but the *Kammergericht*, the highest court, refuses to do so. In view of the slight, but definite, possibility of error in this delicate test the English courts have hitherto taken the same attitude.

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### Recent Advances in Microscopy: Biological Applications.

Edited by A. PINEY, M.D., F.R.C.P., Director of the Pathological Department, Cancer Hospital, London. London: J. and A. Churchill. 1931. Pp. 260. 12*s*. 6*d*.

CONSIDERABLE advances have been made in recent times in the microscopical sciences. Progress has been the result of improvements in histological technique, like those for the study of the cytoplasmic organellæ, and the introduction of new methods of research, such as micromanipulation. Consequently, there has accumulated an extensive body of knowledge concerning the structure of different types of animal and plant cells, and the relation between morphological appearances and functional activity. This branch of biological science is most aptly described as cytology. It is rather misleading to give the title "Recent Advances in Microscopy" to a book dealing with these topics; one is led to assume by the term microscopy that the methods for the manipulation of the microscope are meant, but this volume is not concerned with these.

The book contains four sections, by different authors. The editor, Dr. Piney, is responsible for the first, entitled the Medical Sciences. Under the heading cell organs he gives a brief account of mitochondria and Golgi apparatus; cytologists for the most part would hardly agree that the designation cell organs should be taken to include no more than these two cytoplasmic ones. There follows a chapter on Tissues and Organs, in which "nothing more has been tried than to give an impression of the present position of certain aspects of human histology in their present state of development." Hence there are no references and, since the book is not intended for the professional histologist, no figures. The second section of the book is written by Mr. Basil Graves, and deals with the Microscopy of the Living Eye. This is admirably illustrated, and can be recommended as a good general account of an admittedly specialised subject. The two remaining sections of this book, entitled Zoology and Botany, deal with recent advances in animal and plant cytology. The former is the work of Prof. E. W. MacBride and Mr. H. R. Hewer, the latter of Mr. E. C. Barton-Wright. In the limited space they give admirable, well-illustrated accounts of recent work, which should be of considerable interest to those desirous of obtaining a general idea of the present lines of advance in the study of animal and plant cells.

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### Groundwork of Biophysics.

By G. M. WISHART, B.Sc., M.D., Grieve Lecturer in Physiological Chemistry and Lecturer in Biophysics, Glasgow University. London: G. Bell and Sons, Ltd. 1931. Pp. 344. 12*s*. 6*d*.

IF the modern medical student does not devote some attention to physical chemistry, it is not the fault of authors of text-books on this subject, which seem to appear at more and more frequent intervals. Great trouble has obviously been taken in the preparation of this volume. In addition to the part dealing only with solutions, it includes such purely physical matters as vision, hearing, and electrocardiography. Students who have decided to yield to the claims of yet another subject ancillary to medicine will find it helpful, for it is clear and not too exhaustive.

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### In Exile.

By Sir RONALD ROSS, K.C.B., K.C.M.G., F.R.S., N.L. London: Harrison and Sons. 1931. Pp. 80.

### Lyra Modulata.

Same author and publisher. Pp. 21. 10*s*. 6*d*. each.

Sir Ronald Ross, in the first of these volumes, publishes verses written at varying intervals from the year 1881 onwards, the dates affixed to the poems ranging over 17 years. The poems have received in the press at different times important notices which are appended to the volume, and which record, with well-deserved praise, the fervid originality of his muse. The second volume is a republication of 12 lyrics originally composed to illustrate different metrical schemes. An introduction explains the method of notation employed by the writer.

## REPORTS AND ANALYSES

### SPARKLING POMMETTA, EXTRA DRY.

(MANUFACTURED BY MESSRS. WM. GAYMER AND SON, LTD., ATTLEBOROUGH, NORFOLK.)

A SAMPLE of this sparkling cider has been submitted to analysis with the following results :—

| | |
|---|---|
| Specific gravity before fermentation | 1066·81° |
| Present specific gravity | 1004·3° |
| Total solids per cent. | 4·0 |
| Alcohol per cent. by volume | 8·22 |
| Invert sugar per cent. | 1·85 |
| Volatile acid (acetic) per cent. | 0·15 |
| Malic acid per cent. | 0·54 |
| Esters (as ethyl acetate: grams per 100 c.cm.) | 0·053 |

A consideration of these figures shows that Sparkling Pommetta is very dry, no less than 77 per cent. of the total solids of the apple juice having been fermented. The alcohol content is correspondingly high. The ester figure is of interest, for it is commonly held that in states of nervous exhaustion alcoholic beverages rich in volatile esters should be selected (Hutchison). If any cider may fairly lay claim to the title of "champagne cider" Sparkling Pommetta would appear to have a good case; indeed, it is difficult from the physiological point of view to see why champagne should be superior in its stimulating effects. In cases where economy is to be considered, and where the judgment of the connoisseur's palate is not of consequence, Sparkling Pommetta will probably prove just as useful in the class of case where champagne is usually prescribed medicinally.

# THE LANCET.

*LONDON: SATURDAY, AUGUST 15, 1931.*


## THE POSITION OF THE ROYAL ARMY MEDICAL CORPS.

THE lack of officers in the R.A.M.C. is the subject of a letter which appeared in the *Times* at the end of last week, above the signatures of Sir ALFRED KEOGH and nine other officers who have held, in recent times, the highest and most responsible posts in the service. The co-signatories, whose collective experience of the subject on which they are writing must be unrivalled, desire to impress upon the public the impending danger, from the shortage of officers in the R.A.M.C., to the welfare of the Army in times of peace, while the reforms which they consider urgent now, to remedy this shortage, visualise the contingencies of war, so that, in such an event, the lamentable breakdowns of the past should be avoided. The purport of the letter is to call attention to the existing situation.

It is common knowledge that certain factors have, for many years, operated in causing a shortage of officers in the Service, and various measures, to the good intentions of which we have called attention, as they were instituted, have from time to time resulted in a certain measure of improvement in the position; but the fact remains that to-day, in spite of the reduction in officers of the R.A.M.C. which has occurred during the last five years in consonance with the reduction of the whole Army since the termination of the war—in spite of this reduction, the officer ranks of the R.A.M.C. approach 200 short of the authorised establishment. The list is 1250 officers, including 290 for India and 126 for the colonies. The R.A.M.C., during the last 12 years, has only received an average of ten new entrants yearly, and that is just one-fifth of the number required, and officers are compelled, therefore, to serve for long periods abroad without proportionate time at home. Here is one obvious reason for the unpopularity of the Service, and while the families of the officers suffer, the perpetual shortage is reflected in the plight of the troops and their families serving overseas. Sir ALFRED KEOGH and his distinguished co-signatories point out insistently that a fully trained and adequate nucleus in peace time is a vital necessity, both to meet present circumstances, and to afford proper opportunities for expansion in the case of mobilisation. They point out that an efficient peace establishment is a necessary prelude to the holding of administrative posts in the R.A.M.C., which require prolonged training for their satisfactory tenure. This is, in so many words, a denial of the efficiency of the short-service system, which was designed recently with a view of counteracting the perpetual lack of officers.

The shortage of officers in the three fighting Services has been investigated by a committee of the British Medical Association, whose report appeared in April of this year. With regard to the position of the Royal Army Medical Corps, the views of the committee are extremely clear: they find that the financial situation of the Service is unattractive, that the present rates of pay and retired pay are inadequate, and the methods of promotion open to criticism. Of these findings, the letter of Sir ALFRED KEOGH and his brother officers furnish exact confirmation, and no other conclusion can be come to than that which they arrive at—namely, that an immediate increase in the pay and pension of these officers must be forthcoming, together with improvements in their training. This call for further expenditure in a public service is simultaneous with a national call for economy; but the Report of the Committee on National Expenditure states explicitly that "the present strength of H.M. Forces is no more than adequate for requirements under present world conditions," and the number of R.A.M.C. officers is some 20 per cent. below strength.

## CHEMOPROPHYLAXIS IN MALARIA.

Lieut.-Colonel S. P. JAMES and his collaborators, including the medical students who participated, are to be congratulated on the successful outcome of the chemoprophylactic experiment described on p. 341 of this issue. We use the word chemoprophylactic intentionally, for, although it is not yet to be found in technical dictionaries, it is a better descriptive term than chemotherapeutic for experiments of the kind recorded. It has the advantage of indicating that in this class of clinical test a distinction must be drawn between the prophylactic action of a drug which truly prevents a disease by killing the infecting germs on their entry into the system, and the therapeutic action of one which wards off the disease by healing it in its incipient stages after infection has occurred. In work on antimalarial remedies the distinction is particularly desirable, because, in this disease, several phases or forms of the causative organism occur in the human host and not all of them are amenable to the same drug. Quinine has an infallible effect on the asexual (vegetative) phase, which causes the fever and other symptoms of malaria, but it has little effect on the sexual phase which is destined to continue the life-cycle of the parasite in the mosquito, and it has no effect at all on the sporozoite form which is injected by the mosquito and is responsible for infection. Plasmoquine, on the other hand, is relatively ineffective against the fever-producing asexual stage, but has a striking action on the sexual stage, and (as recorded in the experiment under comment) seems to kill the sporozoite stage without fail. Evidently the classical chemotherapeutic method of testing antimalarial drugs—the method devised and practised so diligently by the late Dr. ROEHL—will have to be revised in the light of this new knowledge. It is understood that this important matter is already being considered by the Chemotherapeutic Committee of the Medical Research Council, under whose

auspices ROEHL'S method is being practised on a considerable scale at Cambridge and elsewhere.

The results of the present experiment, and of others now being conducted at Horton, should also have a noteworthy influence on future antimalarial policy in the world generally, for they indicate that, from now onwards, chemoprophylaxis and chemotherapy may play a larger part in the control of malaria than they have done hitherto. Everyone will remember that, after ROSS'S discovery of the mosquito cycle of the malaria parasite, KOCH, and later GRASSI, believed that the best hope of overcoming the disease on a large scale lay in an endeavour to break the epidemiological chain by treating the human host, rather than by measures aiming at destroying the insect carrier. That view has since received support from the success which has attended chemotherapeutic campaigns against kala-azar and bilharziasis, but, as regards malaria, field experiments on a similar plan have always failed because taking quinine, although it cures developed attacks, does not prevent either man or mosquitoes from becoming infected. If it is true that, in addition to quinine, a drug has now become available which, when taken in non-toxic doses by healthy people, prevents their infection, and when taken by malaria patients prevents the development of the parasite in the mosquitoes which feed upon them, it is reasonable to suppose that a repetition of KOCH'S chemotherapeutic field trials might have a very different result. On a smaller scale, of course, the benefits of a drug which prevents malarial infection are clear. For example, malaria is the cause of much sickness and many deaths among the officers, crews, and passengers of ships trading to Africa, India, and the Far East. During the years 1918 to 1921 there were at least 20 deaths of seamen from acute malarial attacks during homeward voyages from those countries, and at least 65 from recurrences after arrival in England. In one line of steamers trading out of Liverpool no fewer than 531 cases of malaria occurred in the course of 12 months, and instances are on record in which, during homeward voyages from Africa or India, the disease attacked all except two or three of the whole ship's company. As these merchant ships seldom stay more than a few days and nights in malarious ports, it would be easy to arrange for all concerned to take the prophylactic doses during those relatively short periods and for a few days thereafter.

It is worth while, in this connexion appositely, to explain, in the light of the new knowledge, a "prophylactic trial" of plasmoquine which Dr. OTTO FISCHER was deputed by the Institute of Tropical Diseases, Hamburg, to conduct in April, 1926, on a steamship sailing to the African Coast.[1] The details were arranged by Prof. MÜHLENS, but, not regarding the drug as a true prophylactic, he based them on the view that "although plasmoquine alone is inadequate as a therapeutic remedy in subtertian malaria, some result might be expected from its prophylactic use as cases would be treated in the incipient stage when parasites would be relatively few and easily destroyed." With this object the drug was given in large doses (0·059 g.) on three consecutive days each week, instead of in small doses daily, as should have been done if true prophylaxis was the aim. The method left the 39 participating members of the crew unprotected on four days and nights of each of the nine weeks during which the trial lasted, and it is therefore not surprising that six cases of malaria occurred among them. It was claimed however, that this morbidity-rate (15 per cent.), indicated a successful result in comparison with the rates of 25 to 30 per cent. among the crews of two ships which followed the same route and on which the usual "quinine prophylaxis" was in force. Probably the correct explanation of the difference is that the plasmoquine taken by the crew on Dr. FISCHER'S ship protected them against infection on three days and nights of each week, whilst the quinine taken by the crews of the other ships had no true prophylactic effect.

[1] Fischer, O.: "Über Malariaprophylaxe mit Plasmochin," Beihefte zum Arch. für Schiffs- und Tropen-Hygiene, 1927, xxxi., 43.

## THE MANTLE OF FARR.

WE print in another column an appreciation of the work of Dr. T. H. C. STEVENSON from the pens of the Presidents of the Royal Colleges of Physicians and Surgeons, the President of the Royal Statistical Society, the President of the Section of Epidemiology and State Medicine of the Royal Society of Medicine, and of two other distinguished men of science. It would be something of a work of supererogation to seek to add anything to what has been said by writers so well qualified to give judgment, and, in any case, it would be premature to write of the career of a scientific man who, we may fairly hope, will still increase the debt of gratitude we owe to him by further researches, as if it were at an end. Nevertheless, we may be permitted briefly to recall to the memories of our readers something of the history of the office which Dr. Stevenson has done so much to dignify.

The General Register Office is, in comparison with most of our public offices, a young department; it is not yet a centenarian. A century ago such vital statistics as this country possessed were, if anything, below the standard of those of other civilised communities. Within 40 years English official vital statistics were admittedly the best in the world, and this pre-eminence has never been lost. Everybody knows, or *ought* to know, that this great triumph was primarily due to the harmonious coöperation of a first-rate administrator, GEORGE GRAHAM, and a statistical genius, WILLIAM FARR. Scientific and literary powers were vouchsafed Farr in abundant measure, but these gifts would not have sufficed to establish an efficient public department, and some little meed of praise is owing from posterity to the forgotten administrator who made the department a going concern. Farr was succeeded in office by a man of a different type. WILLIAM

OGLE was, like Farr, a man of the highest character and public spirit, but, while Farr was a self-taught, energetic man of genius, knowing something of many subjects and without complete mastery of any one technique, Ogle was a highly educated, exact scholar, with the inhibitions and reserves that regular education imposes, and the publications of the department in his time lost something of the vivacity which Farr supplied. Ogle's successor, the late Dr. JOHN TATHAM, having the advantage of direct experience of public health administration under modern conditions which his predecessors lacked, effected noteworthy improvements, but even he hardly relieved the annual reports from a certain air of dryness which, in the opinion of some, is the appropriate quality of blue books. Under Dr. Stevenson's auspices this was changed. We do not mean that Dr. Stevenson reverted to the flamboyant method of Farr, and, like Farr and Silas Wegg, dropped into poetry, or, like Farr, made lists of odd surnames and speculated on their derivation. We mean that, like Farr, Dr. Stevenson looked upon the records as the raw material of research, and, using for the most part only the simplest of analytical methods, gave an impressive demonstration of the great and often forgotten truth that very simple methods, in the hands of a man of first-rate ability, will lead to discoveries which men of less ability, even if equipped with all the so-called mathematics in the world, are sure to miss.

We fear that few medical men read the annual reports of the Registrar-General. If more did, medical editors would receive fewer fallacious arguments for publication, and many journeys in search of mares' nests would never have been begun. Nobody has the excuse for neglecting these records of research that they are too mathematical to be intelligible. We can but hope that Dr. Stevenson may be able to use some of his leisure in bringing together into a separate volume his researches into the factors of infant mortality, a book which would at once become a standard treatise. Dr. Stevenson has, indeed, worn the mantle of Farr. When a man of great ability retires from office it is common form to say that his place will be hard to fill. In the present case the difficulty may well amount to an impossibility. Farr had so free a hand as an unofficial research worker, because, 80 years ago, official vital statistics had very little prestige, and important people or interests cared very little what was said by the Registrar-General or his subordinates. That is all changed, and although few really read the reports many use extracts from them as controversial weapons; hence there must inevitably be a tendency to prefer safety to brilliance, to discourage research, which, in the nature of things, cannot be safe. Dr. Stevenson has never been deliberately provocative, as Farr often was, but he has had a literary tact, if we may use the expression, which enabled him to say without provocation many true things not flattering to local or even national self-esteem. The task of his successor will not be an easy one. It will be hard to wear the mantle of Stevenson.

## HYPERTENSION AS A SYMPTOM.

FOR some time it has been recognised that the symptoms associated with the earlier stages of hypertension—that is, before the onset of cardio-vascular changes—are somewhat vague. That these diffuse symptoms of ill-health are due to the rise of blood pressure is rendered doubtful, because there is no correlation between the severity of the symptoms and the increase of tension, because the symptoms may often be relieved without reduction of the blood pressure, and also because definite hypertension may be found in people who regard their health as perfect. A year ago J. E. F. RISEMAN and S. WEISS [1] noted that the symptoms found in these early stages are very like those encountered in cases of psycho-neurosis with normal blood pressure. D. AYMAN and J. H. PRATT [2] have now investigated a series of 100 patients, all of whom had a systolic blood pressure of 160 or more and no evidence of renal impairment; 17 of them were men, and 83 women. The commonest symptoms complained of were headache, pain, "nervousness," dizziness, fatigue, insomnia, and vasomotor disorders. The less frequent symptoms were widespread, and referred to all parts of the body. Further, these troubles were invariably multiple and of long standing, the average duration being over 10 years. Only four of these patients had no complaints. AYMAN and PRATT next examined 50 psycho-neurotic patients of the same age as the others, but with normal blood pressures, and found that in this group the symptoms were almost identical, not only in character, but also in incidence, multiplicity, and duration. Passing on to inquire further into the onset of symptoms in the patients with high blood pressure, they ascertained that this often coincided with emotional disturbances or environmental difficulties. AYMAN and PRATT were thus unable to differentiate between the symptoms associated with the early stages of high blood pressure and those of psycho-neuroses, and as evidence of a similar causation they remarked that so-called hyperpietic symptoms respond to removal of environmental difficulties, to sedatives, and to suggestion. A similar series of cases from which he draws the same conclusions is reported by D. DAVIS.[3]

F. R. NUZUM and A. H. ELLIOTT [4] have tried to assess the part played by past illnesses, infections, and focal sepsis in the ætiology of hypertension. In those patients whose increase in blood pressure was associated with evidence of renal impairment they often found a history of scarlet fever and acute nephritis; but among those classified as "essential hypertension" the incidence of infection and focal sepsis was no greater than among controls. This investigation also suggested that there is no familial factor in the causation of high blood pressure, and that it is not unusually prevalent in patients with arterio-sclerosis of the larger vessels. Excessive obesity, however, was

[1] Amer. Jour. Med. Sci., 1930, clxxx., 47.
[2] Arch. Int. Med., May, 1931, p. 675.
[3] Amer. Jour. Med. Sci., June, 1931, p. 850.
[4] Ibid., May, 1931, p. 630.

twice as common in patients exhibiting hypertension as it was in the control group. M. BACKER [5] too, after discussing the various drugs which have been lauded in the treatment of patients with a raised blood pressure, and after reviewing the various ætiological theories put forward by different workers, is forced to conclude that high blood pressure is not so much a disease as a symptom, which is found in people of abnormal nervous constitution and as a result of increased neuromuscular tonus of the arterial tree. The nervous factor in hypertension is also indicated, he says, by the great lability of the blood pressure, by which minor emotional upsets produce marked alterations of tension. The vegetative nervous system of the hypertensive patient reacts excessively, to slight stimuli; mentally, this constitutional tendency manifests itself in neurotic symptoms, while in the cardio-vascular system it produces hyperpiesis. Ayman [6] has found that the blood pressure is liable to wide variations, particularly in patients with "essential hypertension," and in his most recent paper [7] he shows that this variation affects both the systolic and diastolic pressures to the same degree. The finding that the blood pressure, when observed sufficiently frequently and over long periods, exhibits these changes largely discredits many of the therapeutic effects claimed for various drugs, since, without very careful and frequent estimations before treatment starts, successful therapeutic reduction of the blood pressure may be simulated by minor changes due to emotion and environment.

[5] Amer. Jour. Med. Sci., May, 1931, p. 648.

[6] Jour. Amer. Med. Assoc., June 20th, 1931, p. 2091.
[7] Arch. Int. Med., July, 1931, p. 89.

# ANNOTATIONS

## THE SHORTAGE OF HOSPITAL NURSES.

WE publish as a supplement to-day the Second Interim Report of THE LANCET Commission on Nursing. It contains the questionnaire addressed to hospitals (printed in these columns on Feb. 28th) and a statistical and explanatory summary by Mr. Bradford Hill of the replies received. While comment on the document will not be expected from us, we may conveniently allude to the contents.

It is found that one-fifth of our hospitals fail to secure suitable candidates as sisters; one-half fail to secure the staff nurses and probationers of the standard they require. Nearly one-fifth of the full establishment of probationers leave annually, and it would seem that the hospitals must lose one-third of their annual entry, or in other words, more than one-tenth of their establishment of probationers without their becoming qualified. The improvised arrangements which are being adopted to meet the situation include the employment of temporary nurses, and the alteration of the educational standard. The report presents a picture of the nurse's life in hospital, her hours of work, her pay, her training, and her prospects, the arrangements for her recreation and holidays, her sleeping accommodation, and various other amenities of her career. These conditions are not constant and invariable in all the different classes of hospital; life in a children's hospital, a fever hospital, or a mental hospital has its special features. Making allowances for these differences, wide divergencies in many matters are found to exist. This Second Interim Report does no more than marshal facts and (on its last two pages) mention some opinions. The Final Report, expected to appear later in the year, will endeavour to recommend the remedies. Meanwhile, all who are concerned or interested in hospital nursing have the opportunity to give serious study to the materials which our supplement contains.

## ECONOMO ON ENCEPHALITIS LETHARGICA.

IN 1917 Constantin v. Economo published a monograph entitled "Encephalitis Lethargica" in which he embodied the results of his researches on that disease. Twelve years later he gave an account of his further experience and surveyed the whole position. It is this latter work which Dr. Newman has now adapted to the needs of English readers.[1] Economo devotes some space to an assertion of his claim to have first identified and described encephalitis lethargica, "a new, hitherto unknown epidemic infectious disease, *sui generis*." This priority and the author's brilliant work is so universally acknowledged by neurologists as to make the assertion superfluous. When the disease was described, more or less independently, in 1918, by Cruchet and Netter in France and in England by MacNalty, McIntosh, and Marinesco, Buzzard and Wilson, due credit was given to Economo's prior claims, as soon as his original account [2] came through the war zone. At the same time Economo agrees with Crookshank and other medical historians that encephalitis lethargica has occurred before, although only now recognised as a pathological entity. He identifies with it the nona epidemic of the years 1890–91 in Italy, the "Tübingen sleeping sickness" of 1712, and various outbreaks of epidemic somnolence described by Ozanam, Lepecq de la Clôture, and others. This history is encouraging, for it strengthens the hope arising from the diminished incidence observed in most countries that the disease is disappearing from our midst. It is a fell disease, not only because of its high mortality in the acute stage, but on account of its severe after-effects. To these, under the title of "chronic post-encephalitic diseases," Economo devotes special attention, giving a concise account of the therapy both medicinal and psychological which his experience has shown to be useful. Dealing with the epidemiology and the character of the infection Economo considers it probable that the virus settles first in the naso-pharyngeal cavity and thence spreads along the lymphatic channels into the nervous system. It is therefore a droplet infection. He states that transmission of the disease from person to person seems rare and presumes this to be of secondary importance, because the virus once settled within the skull has little chance of getting out (*virus en cage* as Netter puts it). Here he seems to us to have paid rather scant attention to the possibility of carrier infection. In this respect

[1] "Encephalitis Lethargica: its Sequelæ and Treatment," by Constantin von Economo. Translated and adapted by K. O. Newman, M.D., Oxford University Press, London: Humphrey Milford. 1931. Pp. 200. 18s.
[2] Wien. klin. Wochensch., 1917, xxx., 581.

encephalitis lethargica seems to follow the epidemiological behaviour of two other epidemic diseases of the nervous system, cerebro-spinal fever and poliomyelitis, in which contact infection plays a major part, but frequently escapes clinical notice because transmission is by the healthy carrier. Economo agrees with the view that the encephalitis of influenza is quite distinct from encephalitis lethargica. His book contains an excellent account of the acute forms of the malady, their course and prognosis, and of the morbid anatomy of both acute and chronic forms. A pleasing feature is the generous tribute paid by the author to the work of British investigators and to the report (1918) of the Local Government Board. Economo concludes his book with the remark: "Encephalitis lethargica can scarcely again be forgotten." Even if the time should happily come when the disease can only be studied in books such as this, Economo's fundamental discoveries will continue to influence the study of neuropsychology.

## ACCESS TO MUNICIPAL HOSPITALS IN BIRMINGHAM.

THE Birmingham City Council has confirmed its decision to exclude general practitioners from the treatment of patients in its two municipal maternity homes. There was a time when the patients might be attended by their own doctors if they wished, but most of the deliveries were undertaken by midwives and, when help was needed, the local practitioners were summoned by the matrons. Difficulties however seem to have arisen in maintaining a uniform standard of efficiency and in obtaining the doctors just when they were wanted. About a year ago the Council came to the conclusion that the employment of whole-time officers would avoid embarrassments, ensure better care, and minimise the risk of infection, as well as providing staff for the antenatal wards, premature babies' wards, and child welfare clinics. It would also enable the pupil-midwives to receive uniform instruction and supervision and would ensure that the medical officer who had watched the antenatal period should have charge of the confinement. The work of private practitioners was to be safeguarded by imposing an income limit for patients admitted to the homes.

The Council was so convinced of the value of these advantages that, although the practitioners protested, it would not consider reverting to the old method. It was prepared however to consider an arrangement whereby a doctor might send his private patient into one of the homes and follow the case through. In collaboration with the local division of the British Medical Association, the Council tried to work out a scheme. The Association made it clear that Birmingham practitioners wished ultimately to follow their own patients into all the hospitals of the city, and set out a series of proposals for the management of the maternity homes. They suggested that each home should be run by a committee of six, three appointed by the municipal authority—one of them in executive control of the home—and three being general practitioners, the chairman being an obstetrician. Every practitioner living within two miles of the home should be asked whether he was willing to attend his own patients and emergencies in the home, subject to the rules and regulations of the committee, and those signifying assent should form a rota. This would ensure that every patient had an approved doctor and—subject to his being willing and available—the doctor of her choice. The Council however found itself unable to agree to this proposal on the grounds that it could not forgo direct responsibility for the management of its institutions; that the executive medical officer would be in an anomalous position, being only one of a committee of control; and that the variations in standard and the difficulty in securing prompt attendance would not be removed. There the matter rests. The practitioners uphold their claim to access, maintaining that the standard of work would be as high as could be obtained by other means. The Council disagrees and has intimated that it sees no advantage in continuing the discussion.

## TUBERCULOSIS IN RUSSIAN INFANTS.

Dr. E. Rautenstein, who is in charge of a welfare centre in Leningrad, has studied[1] seven babies who showed symptoms of tuberculosis before completing the third month of life. Out of a total of 213 infants under observation by her at the centre, twelve gave a positive tuberculin reaction and among these were the seven infants with clinical evidence in addition to the biological reaction. Dr. Rautenstein first discusses whether infection took place before or after birth. She concludes that intra-uterine infection is of more importance than is usually admitted, particularly if the view of Calmette and his collaborators as to the existence of a filtrable virus is accepted. At the same time it has to be remembered that so-called intra-partum infection cannot be altogether excluded and a strong case against postnatal infection can be made out if the liver is more severely affected than the lungs. In the cases described a decision was impossible because the isolation of the mother from the child directly after birth had not been carried out. In the first rank of clinical evidence comes the temperature chart; it was sometimes possible to trace a short initial fever, then a nearly afebrile period during which the tuberculin test became positive, and a terminal febrile phase. This sequence was not always seen because of the circumstances under which the infants were observed. At the earliest stage a frequent occurrence was a period of vomiting and loose stools due, in the author's opinion, not to local bacillary invasion of the alimentary tract, but to a general reaction of the body to its first dose of tubercle toxin. Physical examination of the lungs revealed, as a rule, evidence of infiltrated areas by alteration in the percussion note, the breath sounds being commonly diminished. Cough was absent until shortly before death except when there was pressure of enlarged mediastinal glands upon the trachea or main bronchi; then it had the characteristic "ringing" timbre. Hæmoglobin and red cells were diminished in all cases; a definite lymphocytosis was only present in cases which recovered. The sedimentation rate was higher in the fatal cases but the rate required checking by the lymphocyte count and the tuberculin test; with consistent positive test and high count, a rate above normal was not inconsistent with recovery. Liver and spleen were enlarged in all the seven cases. Dr. Rautenstein doubts whether tuberculosis is really becoming more frequent in the early months of life. Slow loss of weight, slight fever, and anæmia following a short bout of diarrhœa and vomiting lead to a diagnosis of "marasmus" which is rudely upset at the autopsy by the discovery of tuberculosis. Such errors, which are unfortunate in leading to the source of infection being overlooked, could, she

[1] Jahrb. f. Kinderh., 1931, cxxxii., 75.

thinks, be largely avoided by systematic radiological examination of the chest. Even at this early age the disease is not necessarily fatal; three cases in her series appeared to make a good recovery.

## DIABETES MELLITUS IN THE UNITED STATES.

A RECENT analysis of the apparent increase in the death-rate from diabetes mellitus in the United States has brought to light some noteworthy facts.[1] The increase is not at all uniform, it seems, when analysed by age, sex, or race. Mortality among older women, especially among coloured women, shows a rise which more than outweighs the great and definite improvement among the young. In the years preceding the discovery of insulin the death-rate from diabetes was steadily increasing at all ages under 45; since 1922 there has been a sharp decline at those ages. Among males above this age the rate has remained fairly steady during the insulin period, but among females it has been stationary only between the ages of 45 and 55, and above this there has been a steady rise. Over 65, the mortality has increased among males by 25 per cent. and among females by 40 per cent., and if we take the last four-year period the increase has been 33 per cent. and 50 per cent. respectively. Among negroes there has been no improvement whatever. The death-rate for males under 45 has been stationary, while for females it has increased 60 per cent. Over 45, the male negro death-rate has gone up by 20 per cent. and the female by 75 per cent.

Unfortunately, it is not clear from the analysis whether diabetes was the primary or merely a contributory cause of death, and it may be that the increase in the older classes is due to improved diagnosis, and that the deaths were due to such causes as arterio-sclerosis, which, as Prof. D. M. Lyon and Dr. Murray Lyon [2] have pointed out, is as likely to be a cause of diabetes as a result of it. These authors showed that in deaths from coma the average age in 150 cases was 37 years, while in "non-coma" cases it was 62. It is difficult, however, to see why improved diagnosis should apply to women more than men, and to coloured women more than white, and the figures strongly suggest that on the whole the incidence of diabetes has risen and that insulin does not deal effectively with the "degenerative" type of diabetes in elderly people, where this disease is only a small part of the picture.

Another interesting contribution is a study of 300 diabetic ex-Service men undertaken by the Medical Service of the United States Veterans Bureau.[3] While no special tendency to diabetes, or modification of its effects as the result of warfare, seems to have been proved, the investigation confirms many of the points which have emerged from the study of the disease among the general population. For example, it was found that cases with a normal cholesterol content of the blood were more amenable to treatment than those in which it was high. The chief cause of the persistence of hyperglycæmia and glucosuria, in spite of insulin therapy, seemed to be the presence of complications or co-existing diseases—79 per cent. presented such complications, and the average number was 2·6 per patient. The mortality was 4·6 per cent., and in the 14 fatal cases five of the patients were over 45 years old. The principal cause of death in these five cases was stated to be diabetes mellitus in two, diabetic gangrene in two, and pulmonary tuberculosis in one; while the secondary causes were all arterio-sclerosis or its variants. Of the nine deaths under the age of 45, diabetic coma was the principal cause in four, pulmonary tuberculosis in four, and nephritis and myocarditis in one. An instructive feature of the series was that in only five out of 300 cases (1·7 per cent.) did the clinical symptoms in themselves denote the presence of diabetes, whilst 30 cases (10 per cent.) were entirely symptomless. This is exactly the figure given by Joslin, and shows once again the importance of routine examination of the urine.

[1] Statist. Bull., Life Extension Inst., N.Y., May, 1931.
[2] THE LANCET, 1930, ii., 293.
[3] Matz, P. B.: Military Surg., May, 1931.

## METROPOLITAN WATER.

Sir Alexander Houston's [1] report on the chemical and bacteriological examination of the London waters deals with the 12 months ended Dec. 31st, 1930, and the Director of Water Examinations to the Metropolitan Water Board for the twenty-fifth time supplies a valuable scientific year book in a fascinating way, incorporating into statistical and laboratory statements and memoranda much apt and amusing anecdote.

The report commences by a description of the chlorination of the Thames and New River water, and as chlorination will, at any rate, until something preferable for bactericidal purposes be found, be an accepted process of purification, it is useful to read the arguments in its favour. The change of front on the part of the public, from hostility to tolerance, and from tolerance to appreciation, is marked, and Sir Alexander holds that this revolution of opinion has followed the publication of definite information on the subject no less than the technical improvements in method. The public has learned that chlorination is a cheap and harmless way of destroying the known germs of epidemic water-borne disease, while the great objection to the process, the taste, which was, when chlorination was first introduced, a very definite one, has been met successfully. The water-consumer has a right to demand a water which is not only safe, but which is inoffensive to the taste, and this position has been reached. But much careful experiment and assiduous trial has preceded this satisfactory result, the production of a tasteless as well as a safe water having considerably tested the resources of chemical research; and Sir Alexander may be legitimately proud of the ability to state that now in 999 out of 1000 supplies success has been achieved. But he is not unduly complacent, for he asks his readers not to regard chlorination, however carefully and efficiently practised, as the ultimate solution of all water problems. "We must still," he says, "seek virgin sources of water-supply, still retain and maintain, as far as this is reasonably practicable, the old-established armoury of defence." Chlorination, that is, should be regarded primarily as a means of amplifying security, to whatever extent it has already been secured.

Following the information on chlorination, we have a section on prefiltration waters, which is introduced by Sir Alexander with a paragraph in which he likens the 49 storage reservoirs, extending over 2700 acres and holding about 20,000 million gallons, to a great lake, and he finds that the feeling of safety engendered by the comparison of these reservoirs to a natural lake is not misplaced. In 1922 the examination of pre-filtration waters, partly suspended in the period following the war, was reconsidered by the Board,

[1] London: P. S. King and Son, Ltd. Price, 21s. net.

when it was determined to examine completely and thoroughly, chemically and bacteriologically, and each week, all the various kinds of water which feed the filters, raw water, stored water, gravel water, and so on. There were certain difficulties incurred in the bacteriological examination, but the disadvantages were compensated for in other directions, and the bacterial and chemical figures, as summarised under bacteriological and chemical results, of raw river and prefiltration waters make remarkable reading.

We have next an interesting description of the search for pathogenic microbes in crude sewage, for which examples were collected at the Barking outfall hourly for 24 hours, and mixed proportionately to flow. The procedure in searching for the typhoid bacillus is set out at length, with close analysis and tabular statements. The relation between water-supply, the composition of sewage, and the meteorological conditions is recognised in a section comprising meteorological notes extracted for the most part from the *Meteorological Magazine*. A comment on the position in this country for the year 1930, contained in a communication made to the *Times* of Jan. 28th, 1931, by Mr. E. G. Bilham, is quoted as follows: "Decade for decade, year for year, and month for month, the ten years from 1921 to 1930, and the year 1930 itself, have, in the amount and persistence of the rainfall, surpassed most of the records of nearly all the corresponding periods since 1731. In the last 200 years only one previous decade—that of 1871–1880—has had a higher mean rainfall than that which has lately come to a close, with a correspondingly damp December." Sir Alexander must be one of the few people who can derive pleasure from such a statement; and his comment is to "hope that the amplitude of our sources of water-supply are not likely to be imperilled." The report closes with a description at some length of the Kempton Park Works, which, as the most up to date of all the Board's works, deserve this special notice.

## GASTRITIS SIMULATING PYLORIC ULCER.

A STUDY of affections of the pylorus simulating ulceration has lately been published by Dr. Östen Holsti[1] of Helsingfors. It was prompted, he says, by two cases of severe dyspepsia treated in hospital in 1928 and 1929, in which operation was performed on account of suspected ulceration. No ulcer was found, either in the resected or in the remaining parts of the stomach and duodenum, but the microscope showed acute deep gastritis. Holsti has since carried out detailed microscopical and other examinations in similar cases, and the material he now presents consists of 14 patients, of whom only three were women. There was a history of chronic constipation in six cases, and the dyspeptic symptoms had often begun in early youth, and had lasted several years. In as many as 11 cases they were those of an uncomplicated, juxta-pyloric lesion. The Wassermann reaction in the blood was always negative. There was a history in many cases of temporary improvement following dietetic treatment based on the diagnosis of ulceration. When these patients came to operation, no ulcer of the pylorus could be found, but microscopical examination showed signs of endo-, myo-, and peri-gastritis. The two main seats of the inflammatory process were the mucosa propria and the plexus myogastricus. In half the cases, permanent relief from all the symptoms followed the resection. Of the remaining seven, two derived only temporary improvement from it, two did not even experience temporary improvement, and three could not subsequently be traced. Holsti concludes that his material represents a somewhat heterogeneous group, in the members of which there was an interplay of various factors of no uniform character. No case was so simple or early that only a single factor could be held responsible for all the morbid changes, and it would seem, he says, that a vicious circle is constituted by the inflammatory factor, disease of the arteries, venous stasis, and changes in the intra-mural plexuses—all or some of which are to be found in various degrees and combinations in each case.

[1] Acta Med. Scand., 1931, lxxvi., p. 343.

## PHYSICAL CONCOMITANTS OF MENTAL DISEASE.

THE research laboratories of the City and University of Birmingham have become associated particularly with the discovery of focal sepsis in cases of mental disease. The latest report, covering the twelve months ended March 14th, records a continuation of this work; in one murder-suicide case the sphenoidal sinus was found full of glairy muco-pus, and in a case of insanity following typical encephalitis lethargica the sphenoidal sinus showed marked chronic disease and contained pus. No less than 5367 specimens have been examined and reported upon by the laboratory, a work which has necessitated the manufacture and use of 42,500 tubes of media and 5470 plates of culture media, an average of 3500 tubes and 456 plates per month. Research into nasal sinus bacteriology accounts for the greater part of these. A new method of examining fæces for typhoid and dysentery organisms, by intraperitoneal injections of specially prepared material into mice, is being studied, and further work on agglutination tests has been carried out. As a result of a large series of experiments a method of demonstrating blood in brain vessels has been devised which is superior to the best injection methods and does not possess their insuperable difficulties. This method opens up a new field of research in cerebral localisation. By applying it to sections one quarter of a millimetre thick it is possible to examine a whole brain in a couple of months. Chemical experiments have been continued on the resistance of red blood corpuscles to hæmolytic agents under varying conditions, and the permeability of the corpuscular envelope to inorganic substances and dyes has been quantitatively investigated. The permeability of colloid albuminous substances without lipoidal envelope has been determined by the use of masses of raw egg-white. An attempt is being made to separate viruses from brain-mash obtained post mortem by cataphoresis, using hæmoglobin as an indicator. A series of experiments has been undertaken to show whether heat alone is responsible for the temporary increase in the permeability of the brain membranes which is known to occur during malarial treatment of general paralysis; results so far seem to indicate that it is.

## THE WORLD'S REQUIREMENTS OF NARCOTIC DRUGS.

SINCE the production and distribution of opium, morphine, heroin, and cocaine assumed international importance under the Opium Convention signed at The Hague in 1912, various estimates have been propounded as to the amounts of these drugs required for legitimate medical purposes. The Health Section of the League of Nations a few years ago arrived at the conclusion that 10·4 tons of morphine, 0·87

tons of heroin, and 6·0 tons of cocaine might be held to represent the world's annual requirements. A laborious and elaborate analysis, recently completed by the secretariat of the League and based on the statistical returns from the various manufacturing and consuming countries has resulted in yielding uniformly lower figures than those vouchsafed by the Health Section. The secretariat's figures are 8½ tons of morphine "as such," about half a ton of heroin, and 5 tons, or rather less, of cocaine. The figure for morphine is given for "morphine as such" because there is also to be brought into account the morphine used for conversion into codeine, morphine esters, and ethers, which have not hitherto been classed as "dangerous drugs," as well as into dionin and apomorphine. If morphine so utilised is to be included the secretariat puts the annual requirement at 31½ tons for all purposes, although the actual manufacture of morphine in 1929 amounted to 59½ tons, and it is estimated that not less than 100 tons of morphine in all its forms passed into illicit traffic. As regards raw opium the League's secretariat gives 375 tons as the annual world requirement for legitimate purposes; there is, however, also the opium prepared for smoking, of which some 600 tons are annually exported, for which India is responsible to the extent of 66 per cent. Lastly there is the opium consumed in British India, which amounts to 200 or 250 tons a year.

## THE HISTORY OF THE AMPUTATING KNIFE.

THE historical section of the Museum of the Royal College of Surgeons has received many additional possessions during the past twelve months, some of which are described in the annual report of the Museum. Of these, not the least interesting to surgeons and students are the specimens illustrating the history of the amputating knife, which show the many changes that the blade of this instrument has undergone during the past thousand years. The series, arranged chronologically, begins appropriately with a replica of a Roman scalpel or cutting knife that was found with other surgical instruments at Pompeii; for the first description of the amputation of a limb is that given by Celsus (A.D. 30). This is followed by the model of an amputating knife described by Albucasis, with a long straight blade terminating in a sharp point, called by him a "knife-rasor," which was employed in the tenth century. Next is a model made from a drawing in the manuscript work on "Chirurgery," written by John Wryghtson, an English surgeon, in 1350. The blade of this instrument is short and at the extremity is curved slightly inwards. A century later, as shown in the next specimen, the form of the blade was completely changed and is curved backward with the cutting edge on the outside instead of the inside of the curve. In 1578, Ambroise Paré, in his "Chirurgie," described two knives that he used when amputating, one of which he calls an incision knife and the other a "crooked knife for dismembering," the blade of which is crescent-shaped with the cutting edge on the inside. The amputating knife described by another famous French surgeon, Guillemeau, in 1594, has a broad blade curved only at the extremity and is similar in shape to Wryghtson's knife of the fourteenth century. The knife described by Fabricius Hildanus in 1646, of which a model is shown, differs widely from its predecessors. It has a heavy blade shaped like a scimitar with the cutting edge on the outside of the curve. But this innovation apparently did not last long, for in 1665 Scultetus describes the amputating knives used in his time as having a crescent-shaped blade and figures a "crooked knife, wherewith," he says, "the flesh is to be cut in so far as the bone which must be saw'd off."

Early in the eighteenth century Sharp introduced his amputating knife with a curved blade which was sometimes made with a double edge, and later Perret's still more crescent-shaped blade with a periosteal elevator came into use in France about 1772. From 1760 to 1775 the curved blade of varying shape was favoured and it was in general use until 1788, when Loder advocated a knife with an almost straight blade which he had found to be effective. From about this period, the straight-bladed and relatively small amputating knife began to replace the strongly curved instruments used by Sharp and other surgeons in the earlier part of the eighteenth century. Benjamin Bell figures a straight knife in his "System of Surgery" in 1788, and Savigny in 1798 illustrates a knife with a blade intermediate between Bell's and Perret's, which shows that the straight type was gaining in favour. Savigny points out that "care should be taken in the construction of this instrument that the back is not thicker than is absolutely necessary to give and support the required firmness of the edge, otherwise it becomes unwieldly in its management." Sir Astley Cooper, however, appears to have preferred the broad back, for his amputating knife, shown in the series, has a very thick back with the sides of the blade much smoothed along its borders, but the blade is straight. Lisfranc, who observed that he preferred straight knives for amputation, taught that "when a knife is required for the forearm or leg, the cutting edges should be extended to the insertion of the blade into the handle." He therefore had his knives made with long slender blades with double edges. In 1846 Robert Liston established the long straight blade in favour, and this type has remained almost unchanged. His knives, which he had made in various sizes, sometimes measured over a foot long in the blade alone and were finished with a dagger point, the backs being sharpened for the last two inches. The cutting edge was almost straight till it curved upward near the free end to meet the back. In his "Practical Surgery" he thus explains his reason for the long slender blade: "The form and size of the instrument ought always to be in proportion to the extent of the proposed incisions as regards both their length and depth. If an extensive incision is necessary, an instrument presenting sufficient length of edge must be employed so that the parts may be separated smoothly and quickly." Although his knives had wooden handles, Liston always insisted that the handle of a surgical knife should be perfectly smooth and polished, so it could be effectively cleansed, and this idea was adopted by Lister.

This series serves to illustrate the interesting fact that in re-establishing the advantage of the long straight blade, Liston was but reviving a type that had been used by the Arabian surgeons of the tenth century.

## INDEX TO "THE LANCET," VOL. I., 1931.

THE Index and Title-page to Vol. I., 1931, which was completed with the issue of June 27th, is now ready. A copy will be sent gratis to subscribers on receipt of a post-card addressed to the Manager of THE LANCET, 7, Adam-street, Adelphi, W.C.2. Subscribers who have not already indicated their desire to receive Indexes regularly as published should do so now.

# SPECIAL ARTICLES

## A NATIONAL MATERNITY SERVICE.

### ANALYSIS OF FOUR SCHEMES.

Prof. J. M. Munro Kerr, at the forty-second Congress of the Royal Sanitary Institution held at Glasgow from July 4th to 11th, set out a scheme for a national maternity service. This differs in many respects from those already outlined in the Interim Report of the Departmental Committee on Maternal Mortality and Morbidity, published in August, 1930, and from the British Medical Association's Memorandum on a National Maternity Service Scheme for England and Wales, published in June, 1929; but it has a number of points in common with that described by Prof. W. Blair Bell in our issue of June 13th last.

### GENERAL OUTLINE OF THE SCHEMES.

The need for more systematic and better antenatal and postnatal care is admitted by all. Prof. Blair Bell declares that the people who know most are not always in charge, and urges a scheme to pool resources.

The essential elements of the schemes of the Departmental Committee and the B.M.A. are the provision of a trained midwife to be responsible for the conduct of pregnancy, labour, and the puerperium; to supervise the patient, to teach her hygiene, and to call in the doctor for any abnormality or difficulty. Every patient at the same time is to be in touch with the doctor of her choice, who will make at least one statutory antenatal and one postnatal examination, and attend as required. The antenatal clinics in both these schemes would become more and more consultative or educational, and would only exist as routine centres where the doctor preferred to make his antenatal examinations at a clinic rather than his own consulting-room.

Prof. Munro Kerr starts from the same premise as the others—that the normal midwifery of the country is passing, and will continue to pass, into the hands of midwives, and that general practitioners for the most part do not wish to retain it. Those of them who are specially interested, and can spare the time, will be included in his obstetric service.

While the schemes of the Departmental Committee and the B.M.A. start, as it were, from the periphery—concentrating on the individual patient—those of Prof. Blair Bell and Prof. Munro Kerr work outwards from the centre, concentrating rather on the institutions that are to form the nuclei of the service.

### ACCESSORY SERVICES.

The reports of the Departmental Committee and of the B.M.A. discuss the subject under the headings: doctor, midwife, accessory services. The doctor and the midwife are to perform the services already described, and both reports urge the need for better education in medical schools and midwives' training schools. Both suggest that an anæsthetist should be available under the scheme when required, but neither proposes the provision of anæsthesia for normal cases—a probable demand of parturient women in the future. Both provide for consultant services when the doctor in charge needs them, and both allow for institutional care of abnormal cases and of normal cases at the patient's wish or when home conditions are bad. Prof. Munro Kerr would have every primipara delivered in an institution. Both the Department Committee and the B.M.A. hope that the general practitioner will be able to follow his cases through their institutional period, but the Departmental Committee suggests that some one person—perhaps one general practitioner in a district—shall be appointed in charge of the institution, to give unified control and maintain the standard of treatment.

The B.M.A. wishes sterilised outfits to be provided in every case; the Departmental Committee would only have them "where required." The B.M.A. provides for home helps, and the Committee regards them as desirable. The other two schemes do not deal very much with these points. Prof. Blair Bell would have anæsthetics available everywhere, and would provide home helps. He would, however, make a radical change in the midwife system, insisting that all nurses who undertake obstetric work should be fully trained and should live in hostels, whence they would work both the clinics and the midwifery service.

### THREE TYPES OF HOSPITAL.

Prof. Munro Kerr and Prof. Blair Bell both propose a regional scheme based on three types of hospital; Prof. Blair Bell compares his types to the base hospital, the field hospital, and the casualty clearing-station, familiar to us in the war. With these correspond fairly closely Prof. Munro Kerr's primary, secondary, and subsidiary institutions.

*The "Primary" or "Base" Hospital.*—Prof. Blair Bell would have areas of approximately 50 miles round a teaching hospital. At this base hospital he would have both students and midwives taught, and general, consultant, and specialist services provided for the area. He stresses the importance of having this in a general hospital, partly for reasons of economy, partly to ensure a better sense of proportion, and partly because of the better nursing service and the readily available consultative service in all departments. He would build no new maternity hospitals, but would build on to existing general hospitals where more accommodation was necessary. He would have these centres coöperate with existing maternity hospitals.

Here Prof. Munro Kerr differs from him, for he would have his primary hospital at an existing obstetric hospital. The teaching in these units would be primarily for medical students and not for midwives, and stress should be laid on post-graduate courses. The work would be general, consultative, and investigatory, with a domiciliary service, but not postnatal or infant welfare. He agrees with Prof. Blair Bell that the unit should be in charge of a university professor, so that there could be coöperation with the university laboratory and staff. He would do gynæcology in these primary units, but lays less stress on it than Prof. Blair Bell does in his base hospital, and would do especially emergency work, the primary centre being connected with the surrounding area by an efficient motor ambulance service. These should also be the research centres, equipped with first-class laboratories.

*The "Secondary" or "Field" Hospital.*—The second class of hospital in Prof. Munro Kerr's scheme would be of three types:—

(*a*) Other hospitals in cities where a "primary" is situated; these should be autonomous with full status, but they should not take the most difficult or the emergency cases, but should be reserved for "clean" cases and do the ordinary

## NATIONAL MATERNITY SERVICE: COMPARISON OF THE FOUR SCHEMES.

| — | DEPARTMENTAL COMMITTEE. | B.M.A. | BLAIR BELL. | MUNRO KERR. |
|---|---|---|---|---|
| Principal idea of scheme. | Provision of midwife for every case, and doctor for ante- and postnatal care and abnormality. | Same as Deptl. Ctee. | Definite National service to pool resources and give control to obstetricians. | Network of obstetric centres on basis of existing organisations. |
| Duty of doctor. | Responsible from "booking" to end of puerperium; specified antenatal and postnatal examinations. Attendance as required by midwife. | One prescribed antenatal and one postnatal examination and see patient when referred by midwife. | General practitioners or pædiatrists would staff clinics remote from the hospitals and some of the clinics at large hospitals ("field"). | General practitioners would staff cottage hospitals and the antenatal, postnatal, and infant welfare clinics run from them. Panel of G.P.'s specially interested. |
| Duty of midwife. | To supervise; teach hygiene; arrange antenatal care; attend labour and puerperium (14 days); advise postnatal examination; refer to doctor for any abnormality. Standard of midwife to be raised. | Same as Deptl. Ctee. To have more practical training. | Midwives to be abolished and all obstetric nurses fully certificated, living in hostels and working the clinic and domiciliary service from them. | — |
| Duty of clinics. | To become more and more consultative and to teach midwives. | To teach mothercraft. If doctor prefers to see his patient in a clinic, then a clinic should be arranged for him at the local maternity hospital. | Those at "base" to be consultative. | To become sorting-out centres, keep records, do simple laboratory tests, and arrange supplementary services and domiciliary work. |
| Domiciliary services. | Average case to be attended at home. Home helps desirable. | Normal cases treated at home. Home helps to be available. | To be run from "field" hospitals, worse cases being referred to base. Home helps. | To be run from all three types of hospital by G.P.'s specially interested and prepared to undertake whole care. Home helps. |
| Delivery in hospital. | Beds for abnormal cases; when the home conditions are bad or when the patient wishes. G.P. to follow case through. | Beds where required (as in Deptl. Ctee). Same doctor to attend if possible. Three per cent. need hospital treatment; 1500 beds required. | One quarter of cottage hospital beds (not less than three) should be maternity. | All primiparæ to be delivered in an institution, in addition to those recommended by Deptl. Ctee. |
| Anæsthesia. | Anæsthetist to be provided for abnormal cases free; at a fixed fee for normal cases. | Anæsthetist to be available when needed. | Available everywhere. | — |
| Consultant. | To be available when required. | Same as Deptl. Ctee. | Bad cases sent to "field" or "base" hospital. | Bad cases to be sent to primary or secondary centres by motor-ambulance. |
| Sterilised outfit. | To be provided when needed. | To be provided in every case. | — | — |
| Central organisation. | Scheme to be worked by existing doctors and midwives—with better education. | Same as Deptl. Ctee. | General directing ad hoc body representative of all concerned. Independent chairman. Reports direct to Minister of Health. | General directing ad hoc body with powers to train and discipline midwives. Representative of all concerned. Chairman: chief medical officer of district. |

### THREE TYPES OF HOSPITAL:

### BLAIR BELL.

*Base. Field. Casualty clearing.*

#### BASE HOSPITAL.

At an existing general hospital in a university centre. Run by professor, coöperating with colleagues in university laboratories and at hospital. To be general, consultative, and specialist. To teach students and midwives. To have maternity and gynæcological beds. To cover area of 50 miles radius. Consultative antenatal, postnatal, and infant welfare clinics and beds.

#### FIELD HOSPITAL.

Large general hospital with maternity ward, clinical laboratory, and isolation block. To do antenatal, postnatal, infant welfare, and domiciliary work, in- and out-patients. To work in its immediate district, referring the worst cases to the base. Specialists, junior obstetricians, and general practitioners on the staff.

#### CASUALTY CLEARING STATIONS.

Cottage and small hospitals, one-quarter of their beds being for maternity. Liaison with base. Antenatal and postnatal beds.

#### NETWORK OF CLINICS.

(*a*) At base, run by experts, consultative.
(*b*) Scattered round base, associated with it, and run by junior experts and general practitioners.
(*c*) More remote, connected with field hospital or casualty clearing station, and run by general practitioners and pædiatrists.

### MUNRO KERR.

*Primary. Secondary. Subsidiary.*

#### PRIMARY HOSPITAL.

At an existing maternity hospital in a university centre. Run by a professor, coöperating with colleagues in university laboratories. Senior staff allowed to do private practice. Staff resident as far as possible. To do normal cases and particularly emergency cases, and to be consultative and investigatory. To teach post-graduate students only. No postnatal or infant welfare work. Gynæcological beds and clinic, if possible. Antenatal clinic and beds.

#### SECONDARY HOSPITALS.

(*a*) Other hospitals in city where there is a primary. Independent, with full status, but not to take most difficult cases or emergencies. Teach midwives primarily. Do gynæcology, antenatal, postnatal, infant welfare, and domiciliary work. Staff similar to primary, but simpler.
(*b*) Towns with no primary centre. Hospital does ordinary obstetric work—antenatal, postnatal, and domiciliary—and simple gynæcology and laboratory work. In liaison with nearest primary by motor-ambulance.
(*c*) Cottage hospitals, staffed by general practitioners. Direct the antenatal, postnatal, and infant welfare work of district, and have beds for emergencies and antenatal cases.

#### SUBSIDIARY.

Antenatal, postnatal, and infant welfare clinics, and a domiciliary service under the local health authority. Each clinic associated with a particular secondary or primary. Run by general practitioners, public health officers, and pædiatrists.

work of an obstetric hospital. They would teach students and midwives, but their teaching would be primarily for midwives. They would hold antenatal, postnatal, and infant welfare clinics and have ante- and postnatal beds, and run a domiciliary service. They would also do gynæcology.

(*b*) Hospitals in towns or small cities where there was no primary centre. These would do ordinary obstetric work, provide antenatal and postnatal beds and clinics, simple gynæcology, simple laboratory work, and a domiciliary service. Their antenatal clinics would be consultative for the subsidiary centres.

(*c*) The cottage hospital would deal with emergencies and have antenatal beds, and direct the antenatal, postnatal, and infant welfare work of the area.

The first and second class would be staffed similarly to the primary hospital, but more simply, and the third class would be staffed by general practitioners.

Of these the second group corresponds fairly closely to Prof. Blair Bell's field hospitals, which would be large general hospitals containing maternity and isolation wards and a clinical laboratory, and carrying on antenatal, postnatal, infant welfare, and domiciliary services. They would be built on a standard plan adapted to local needs, and would work in their immediate districts, referring their worst cases to the base hospitals. They would be staffed by general practitioners and junior obstetricians.

*Clinics and "Casualty Clearing Stations."*—Finally, Prof. Munro Kerr would have a limited number of subsidiary centres in large towns or large rural areas. These would be antenatal, postnatal, and infant welfare clinics under the local authority, each associated with a particular primary or secondary unit. They would be the sorting-out and coördinating centres. They would have a secretarial department and a simple laboratory for urine testing. Records would be kept there and social services (home helps, accouchement outfits, &c.) would be arranged from them. The work would be done by general practitioners, public health doctors, and pædiatrists.

Prof. Blair Bell's "casualty clearing stations" correspond to (*c*) of Prof. Munro Kerr's secondary units—viz., the cottage hospitals. Prof. Blair Bell says that each of these should have one-quarter of their beds devoted to maternity, with a total of not less than three, and that they should run antenatal and postnatal work, referring difficult cases to the base hospital or getting help from there. He says that there should be one isolation centre in each district in the same town as the field hospital, in charge of the best obstetrician available. In addition, he would have a network of clinics, those at the base being consultative and run by experts, those scattered round the base being associated with it and run by junior experts and general practitioners, and those in remote districts being run by general practitioners or pædiatrists and being connected with a field hospital or a casualty clearing station.

Prof. Munro Kerr declares that it would not be satisfactory to have the clinics run by public health whole-time workers, and, although it might be tempting to have them run by the staff of an obstetric hospital, he feels that if this were once inaugurated the general practitioners would never get back again. On the whole, he thinks they should be run by practitioners, but he sees the disadvantage that practitioners in large cities would not be able to follow their institutional cases through a hospital.

### THE DIRECTING BODY.

To run this scheme Prof. Munro Kerr would have a general directing ad hoc body with powers to train and discipline midwives. The body should be representative of all concerned—obstetricians, medical practitioners, medical officers of health, midwives, insurance commissioners, Ministry of Health, and local authority—and the chairman should be the chief medical officer of the Health Department. This corresponds fairly closely with the governing body suggested by Prof. Blair Bell, except that he would have the practitioners represented through the B.M.A., and the obstetricians through the College of Obstetricians, and would have an independent chairman. Prof. Blair Bell's great idea is to get the scheme under the control of the obstetricians, whereas Prof. Munro Kerr would associate it primarily with the Department of Health.

Prof. Munro Kerr's two great points are that obstetrics is a distinct entity, and, of all departments of medicine, the one most suited to have a service of its own, and that the present time is peculiarly opportune for inaugurating such a service, particularly on account of the Local Government Act, 1929.

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## AUSTRALASIA.

(FROM OUR OWN CORRESPONDENT.)

### LOTTERIES, APPEALS, AND TAXES FOR HOSPITALS.

Economic conditions are making the financing of the public hospitals in New South Wales particularly difficult. Almost all these institutions depend on large annual Government subsidies, which in the past have been granted on the basis of £1 for each £1 contributed by the public. Not only have voluntary contributions diminished considerably, but the State Government have found it impossible to continue its subsidies on the former scale. The £1 for £1 subsidy has been discontinued, and each hospital receives subsidies at the discretion of a Hospitals Commission. In spite of strict economy and exploitation of every possible source of revenue, a number of hospitals have had to close wards. Recently, the Royal Prince Alfred Hospital, the largest hospital in Sydney, closed 200 of its beds.

The efforts of the State department to meet this extraordinary position have been interesting. Betting has always been a favourite source of revenue for the hospitals, and a percentage of the gross proceeds of the totalisators, which are found on all large racecourses in New South Wales, has always been reserved for them. When funds from this source showed a falling off the deficiency was countered by fairly heavy taxation on all bets made through bookmakers. This however, did not appear to give the anticipated return, and the next step was to make a change in the method of betting on the totalisator. Now, not only is it possible to bet for a place, but there is also a special "straight out tote" in which winnings are divided among the ticket-holders of the first horse only. This has resulted in a considerable increase in the turnover of the totalisator, and thus, indirectly, in the amount available for distribution to the hospitals.

Seeing that large sums of money are contributed annually from New South Wales to a private Tasmanian lottery, and to a government lottery in Queensland, it was not surprising that the State parliament, early in the year, passed an Act for establishing a New South Wales State lottery in aid of hospitals. This was opposed very strenuously by the Council of Churches, a body composed of representatives from most of the Protestant churches in New South Wales. The Council recommended a Church and State appeal, to which the Council would give its utmost support. The Premier agreed to this,

but, it is understood, intimated that if it were not successful a lottery would be instituted. The appeal failed hopelessly, and the State lottery will be launched at a very early date. Tickets will be 5*s*. 3*d*. each, the first prize being £5000, and it is proposed to hold one every ten to fourteen days. It is estimated that a fully subscribed lottery should bring gross receipts for about £26,000, and that it will result in additional revenue of about £400,000 a year.

The Hospitals Commission, in its annual report, suggests a further source of revenue in the form of a special tax on motor vehicles—this although the population is groaning under a burden of taxation which is probably without equal anywhere else in the world. The reason given for the suggested tax is that, as motor vehicles are responsible for an increasing number of accidents, they should be made to pay their contribution towards the hospitals, which deal with their victims. It is estimated that 5 per cent. of the gross total of hospital days, for which all general cases were in hospital, were the result of motor accidents—that is, about 100,000 bed days per annum. It is recommended that an addition of 5*s*. should be made to the registration fee for each motor car, which would give a revenue of £55,000 per annum. From this it is proposed to recoup public hospitals to the extent of 7*s*. per bed per day for all motor accident cases admitted, and 5*s*. for attention to similar cases to out-patients. Further, 6*d*. would be paid for every mile actually travelled by ambulance transport cars for the purpose of conveying injured persons from the scene of the accident to the nearest public hospital.

### ROYAL AUSTRALASIAN COLLEGE OF SURGEONS.

Now that the prefix Royal has been added to the title of the College, the name of the College of Surgeons of Australasia has been changed to the Royal Australasian College of Surgeons, and the latters signifying the Fellowship from F.C.S.A. to F.R.A.C.S. The word "Australasian"—which is at best somewhat vague and unsatisfactory—has been placed in the middle of the name, to avoid confusion with the Royal Colleges of Great Britain. The journal has altered its name to the *Australian and New Zealand Journal of Surgery*.

Although the college has been in existence but a few years, there are now two honorary Fellows, 391 Fellows, and 17 junior members, and at the recent fourth annual meeting, held in Sydney, 30 new Fellows were elected. A revision of the policy of future admission of Fellows is under consideration; it is suggested that each candidate, after he has obtained a senior surgical degree and has served the necessary period of surgical apprenticeship, should be interviewed by a board of censors, which should satisfy itself as to his surgical training and ability. At present the college is trying to obtain some uniformity in the M.S. degrees in the universities of Sydney, Melbourne, and Adelaide, and its efforts have met with a certain measure of success. Each university has agreed to some modification of its regulations for this degree, but they are still far from uniform, and likely to remain so. Adelaide and Sydney have adopted regulations which are for the most part similar, requiring the candidate to pass the first examination in anatomy and physiology (and, in Sydney, pathology), and a second examination, in which he may select a number of groups of subjects. These groups are, roughly: general surgery, obstetrics and gynæcology, diseases of the eye, and diseases of the ear, nose, throat, and larynx. Melbourne, on the other hand, has refused to grant an M.S. degree in the various specialties, for which it is substituting diplomas. At the recent annual meeting of the college it was decided to ask the University of Sydney to pass a regulation to the effect that candidates who passed a Primary Fellowship examination of the Royal College of Surgeons of England, might be exempted from Part I. of the examination for the M.S. degree. Although Melbourne has agreed to do this, it is thought unlikely that Sydney will agree. It is obviously of great importance to the college to obtain a uniform surgical standard of examination, and a number of Fellows think that the only satisfactory solution is for the college itself to hold examinations.

It is likely that the permanent building for the college will be in Melbourne. At the first annual meeting, held at Canberra, a site was granted there by the Federal Government for the erection of a building. Canberra, however, is not altogether suitable, because it is so far from all the executive members.

### THE PRIMARY FELLOWSHIP EXAMINATION.

The Primary Fellowship examination of the Royal College of Surgeons of England begins at Melbourne on Aug. 11th. The following examiners have been appointed: Prof. William Wright, anatomy; Prof. G. A. Buckmaster, physiology; Prof. F. Wood Jones, assessor in anatomy; and Prof. W. A. Osborne, assessor in physiology. Associate Prof. H. S. Summers is superintendent of the examination, and Dr. W. A. Hailes is superintendent of dissections. Although the total number of candidates is not definitely known, there will probably be at least between 20 and 30. The present economic condition of the country will however prevent a number from sitting.

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## PARIS.

(FROM OUR OWN CORRESPONDENT.)

### B C G STATISTICS UP TO DATE.

I SEEM always to be coming back to B C G, and by now, perhaps, some of your readers may wonder if your Paris correspondent has not got an *araignée dans le plafond* as far as this subject is concerned. But I am ready to wager all the gold you have sent us this last week or two that the historian of a century hence will say that the interest taken in B C G in France in 1931 surpassed the interest taken in all the other medical problems put together.

It will be remembered that an inquiry was addressed in January of this year to the tuberculosis dispensaries with experience of B C G vaccination in France. The answers from this source, together with other new statistical data, have now been collected by Calmette, who presented a report to the Academy of Medicine on July 21st. It deals with the period 1925–1930, and with the information obtained from 114 dispensaries, and from the medical practitioners and midwives of 42 departments. The first batch of figures, obtained from the 114 dispensaries, have been handled by Mr. Moine, the expert statistician, and they deal exclusively with the children born and brought up in tuberculous surroundings, and kept under the supervision of the dispensaries. Among the 8075 infants vaccinated, there were 89 who died within the first month of life and 581 who died (general mortality) in the course of the five years under review. There were 371 deaths among 2685

vaccinated infants between the ages of one month and one year, and 121 deaths among the 4811 vaccinated children between the ages of one and four years. Among the 579 vaccinated children over four years there were no deaths. The mortality of the vaccinated infants between the ages of one month and one year, born in tuberculous surroundings, was 4·7 per cent., whereas the general mortality of the non-vaccinated infants of the same age, living or not living in tuberculous surroundings, was 6·1 per cent. The mortality among the non-vaccinated infants, living in tuberculous surroundings, under the supervision of the dispensaries, ranged from 16 to 25 per cent. The information obtained from the 388 medical practitioners and midwives of 42 departments shows that 22,746 children have been vaccinated and kept under supervision. There were 174 deaths (a mortality of 0·7 per cent.) during the first month of life—i.e., before the vaccination could help in any way. There were also 408 deaths from all causes (a mortality of 1·8 per cent.) between the end of the first month and that of the fourth year. Commenting on these figures, Calmette described them as being more satisfactory than he had dared hope. He added that up to July 1st, 1931, some 354,000 children had been vaccinated with B C G in France alone.

#### FURTHER DATA ON B C G.

The first to give B C G to human beings were Dr. Weill-Hallé and Dr. Turpin, who, between 1921 and 1924 gave it by the mouth to 321 new-born infants. The subsequent careers of these juvenile pioneers of experimental medicine are, of course, of exceptional interest, not least to the physicians who took the risk of this particular step. In a communication to the Academy of Medicine on July 21st, Dr. Weill-Hallé presented a study of the comparative mortality among the infants given, or not given, B C G, in 182 families, which included 716 infants. The families were classified according as they were healthy, definitely tuberculous, or suspect. Within the first 12 months of life in healthy families there were 136 non-vaccinated infants with a mortality of 27 per cent., and 55 vaccinated infants with a mortality of 10 per cent. In the tuberculous families there were 175 non-vaccinated infants with a mortality of 29 per cent. (51 deaths within the first year of life), whereas among the 67 vaccinated infants the mortality was only 8·9 per cent. (six deaths). In the "suspect" families there were 215 non-vaccinated infants with a mortality of 37 per cent., and 68 vaccinated infants with a mortality of 16 per cent. Similar marked differences between the fates of the vaccinated and the non-vaccinated, in favour of the former, were found among the children over the age of one year.

#### THIRD INTERNATIONAL CONGRESS ON RADIOLOGY.

This Congress, held between July 26th and 31st, was attended by representatives from some 30 different countries. Madame Curie was elected honorary president, and the inaugural address was given by Prof. Forssel, of Stockholm, who chose as his subject the social campaign against cancer. The fact that more than 300 communications were addressed to the congress will give some idea of its importance. One of its tasks has been to pave the way towards international unification in radiology. To this end a commission has been appointed, on which the principal countries concerned are represented by experts in physics and medicine. An exhibition of the paraphernalia evolved from radiology was organised in the outskirts of Paris, at the Porte de Versailles, and it was amazing to see what a diversity of instruments and apparatus has grown out of this new science. Transportable devices figured prominently, and one of the most conspicuous was a large aeroplane provided with a special radiographic outfit to be used for the wounded who have fallen far afield, and for whom immediate transport is not feasible. The exhibition was open to the public free of charge, but one could not help wondering how this imposing array of highly technical specialties could do more than mystify and vaguely impress the ordinary sightseer.

## MEDICINE AND THE LAW.

### A Question of Age.

If an Act of Parliament refers to "a man of 23 years of age or under," do the words cover a man of 23½? The question has so puzzled the Court of Criminal Appeal that the number of judges had to be increased from three to five in order to obtain a solid decision; in the end the decision, though adequate, was not definite. The disputed words occur in the Criminal Law Amendment Act of 1922. A previous Act of 1885, dealing with the offence of carnal knowledge of a girl between 13 and 16 years of age, allowed an accused person to escape conviction if he could establish that he had reasonable cause to believe that the girl was of or above the age of 16 years. In 1922 this possible defence was abolished; in its place a different proviso was added—namely, that "in the case of a man of 23 years of age or under" the presence of reasonable cause to believe the girl to be over the age of 16 years should be a valid defence on the first occasion on which he was charged with this particular form of crime. This proviso to Section 2 of the Act of 1922 was an improvised piece of amateur draftsmanship. To speak of a girl as "of or above the age of 16 years" is perfectly clear; to speak of a man as "of 23 years of age or under" is ambiguous. A man charged with this offence at Huntingdon Assizes was found to have committed it in March, 1930. He was born on Sept. 26th, 1906, so he had passed his 23rd birthday on the day of the offence and had not yet reached his 24th. Mr. Justice Avory, at the trial, held that the accused was too old to avail himself of this statutory defence. The same ruling had been given in *R. v.* Dumont last year. In the Court of Criminal Appeal the appellant's counsel said a man was "of 23 years of age" until he reached 24. Counsel for the Crown argued that there were three categories—"under" 23, "of" 23, and "over" 23; all these were referable to a definite standard of time, the attainment of the 23rd birthday. The Court allowed the appeal on the broad principle that, when an equivocal word or ambiguous sentence leaves a doubt of its meaning which the canons of interpretation fail to solve, the benefit of the doubt should be given to the subject and against the Legislature, which has failed to explain itself. Even now, therefore, we do not know what the disputed words mean. We are merely told that they are so justifiably disputed that it would not be fair to use them to put anyone in prison. In effect, therefore, a "man of 23 years of age or under" means a man under 24.

The decision hardly seems one of those where fresh legislation is required in order that the law may be brought into line with what Parliament may be supposed to have intended. The reformers, in 1922, were disinclined to accept any proviso, but they were pressed with arguments that the law should not multiply the opportunities of blackmail. Parliament,

it was said, should be slow to make a criminal of a young man who might be honestly misled as to a girl's age; in the matter of dress and the wearing of the hair, distinctions between the ages of 15 and 17 were nowadays negligible. In R. *v.* Dumont the girl was 15 years and 9 months old; she had told the defendant she was 19; the Recorder of London at the trial said she looked at least 17. In the 1922 Act the reformers' main object was to punish the offences of old men with young girls; from this point of view there is little difference between 23 and 24.

### Cremation—the Medical Attendant's Certificate.

A rather insignificant printing error, in the form of the "Certificate of Medical Attendant" (Form B) in the Cremation Regulations, may have caused a disproportionate amount of trouble to the practitioner. The original Regulations, made in 1903, prescribed, in Form B, the following question and direction:—

> 9. What was the cause of death? { Primary. / Secondary.
> (Specify the disease, injury, &c., and if possible distinguish the primary from the secondary cause as in the Death Certificate.)

In 1920 the Regulations were reissued without alteration to this passage. Six years later, the amending Births and Deaths Registration Act enacted that every certificate of cause of death required to be given by Section 20 of the 1874 Act should be "in the prescribed form"; the "Form of Medical Certificate of Cause of Death," subsequently prescribed in the Third Schedule to the Registration (Births, Stillbirths, Deaths, and Marriages) Consolidated Regulations, issued in 1927, speaks of "immediate cause," but omits all reference to the former classification of "primary" and "secondary." Last October new Cremation Regulations were made. The new Form B contains the old question 9 ("What was the cause of death?"), but adds thereto new requirements of information to conform with those on death certificates; the practitioner must now specify "immediate cause," "morbid conditions . . . giving rise to immediate cause," and "other morbid conditions (if important) contributing to death, but not related to immediate cause." But, though the old classification of "primary" and "secondary" has thus disappeared, by some oversight the words "primary" and "secondary" have been left in the form as they appeared on bracketed lines in the original Regulations of 1903. The unexplained retention of these two words must have puzzled many certifying practitioners, but need do so no longer. The Home Office, it is understood, is taking steps to delete the otiose words and to explain that they were printed in error.

# PANEL AND CONTRACT PRACTICE

## RANGE OF SERVICE.

SOME months ago, at a meeting of the insurance committee for the County of London, doubts were cast upon the competence of the committee, consisting as it does of a majority of lay members, to express an opinion on medical questions. The point specially concerns "range of service" cases; laymen must find it hard to decide a question whether an operation or other service advised for, or rendered to, a patient by a practitioner is within the scheme of the practitioner's obligations under the Terms of Service, or whether it involves special skill and experience such as general practitioners as a class cannot reasonably be expected to possess. Under Article 43 of the Medical Benefit Regulations a "range of service" question must be submitted to the local medical committee. If the local medical committee and the insurance committee disagree, the question must be submitted to referees; if they agree it may still be referred to referees by the Minister. In order to place these cases in the clearest possible way before the insurance committee within Article 43, the London medical benefit subcommittee now puts them forward with a definite recommendation that the insurance committee be invited either to agree or to disagree, as the case may be, with the local medical committee. Not only does this procedure comply more exactly with Article 43; it also helps to simplify for laymen, and possibly to limit, discussion of a medical matter.

We note that lately the London insurance committee was invited to disagree (and did disagree) with the local medical committee's opinion that the treatment of varicose veins by injection involved special skill and experience such as general practitioners cannot reasonably be expected to possess. The decision conforms with that of the referees in the Kent and Leicestershire cases mentioned in this column a fortnight ago. On the other hand, the insurance committee agreed with the local medical committee's opinion that the following were services requiring such special skill and experience and justifying the charging of a fee within Clause 10 of the Terms of Service: Refraction for myopia and for presbyopia, refraction under mydriatic for astigmatism and for hypermetropia, ultra-violet rays for neurasthenia, septic tonsils dissected out, and tonsillectomy. Another operation for which a fee was allowed was the incision of a swelling in the middle line of the neck. The patient had suffered from suppuration of one of the deep cervical glands of the anterior triangle of the neck; this necessitated a general anæsthetic and careful dissection in order to expose the gland, which was then incised and a rubber tube inserted. The two committees agreed that this required special skill and experience.

## HEALTH INSURANCE IN SWEDEN.

The reform Bill rejected by the Riksdag in 1930 has now passed both legislative chambers. The system of health insurance set up by it will, however, not come into force until 1935, and as regards medical benefit not till 1938. The new powers make it possible to use sickness funds for purposes other than health and maternity insurance, and the National Labour Office says[1] that the measure is regarded in many quarters as a step towards compulsory health insurance. At present the principle of voluntary insurance is retained but an organisation is set up to prevent the overlapping of funds; the State subsidy is increased, and both sickness and maternity benefits are larger in cash and in kind. An order has been issued requiring insurance institutions to administer the payment of State relief intended primarily for women of small means who are not members of a recognised sickness fund. Uninsured women who cannot meet the expenses connected with their confinement are entitled to an allowance of one krona a day for thirty days, which can be increased to 56 days in the case of women employed in industrial undertakings.

[1] Industrial and Labour Information, August 3rd, p. 165.

# CORRESPONDENCE

## RETIREMENT OF DR. STEVENSON.

*To the Editor of* THE LANCET.

SIR,—We do not wish the retirement of Dr. T. H. C. Stevenson from his official work at the General Register Office to pass without an expression of our deep regret on the event, and of our appreciation of his public services.

Of Dr. Stevenson's contributions to the scientific journals we shall say nothing, except that these would have sufficed to secure a permanent place for him in the history of statistical science. The searching and illuminating discussions of the problems of vital statistics which he has contributed to the census reports and to the annual and decennial reports of the Registrar-General have formed noteworthy landmarks in the study of our national records. Dr. Stevenson's remarkable analysis of the data of the census of fertility, taken in 1911, was a tour de force, while the essays contributed by him to the annual reports of the Registrar-General make a wider appeal and, in our judgment, place Stevenson second only to William Farr amongst those public servants who have secured for England her proud position in the realm of official vital statistics. His studies of the factors of infant mortality, of the local distribution and evolution in time of mortality from tuberculosis, and of the interpretation of the statistics of cancer mortality, especially in relation to its local incidence in the human body, are further examples of immensely important medical research. Dr. Stevenson first demonstrated, upon adequate data, the contrasting rates of mortality of single and married women from cancer of the breast and reproductive organs. This and his more recent studies of the variation of cancer mortality with social status constitute probably the most important statistical contributions yet made to our knowledge of malignant disease.

In these, as in many other instances, Dr. Stevenson approved himself a worthy successor to Farr, and there has been secured that continuity of research into medico-social problems of which the Registrar-General's records form an almost unlimited storehouse. We offer this imperfect tribute to the merits of a great public servant in the hope that our readers may reward him in the way he would most value—by studying these records of first-rate investigation for themselves, and be stimulated to similar inquiries based on our scantily used records.

We are, Sir, yours faithfully,

DAWSON OF PENN.
MOYNIHAN.
J. C. STAMP.
ARTHUR NEWSHOLME.
MAJOR GREENWOOD.
G. UDNY YULE.

August 8th, 1931.

## IMPRISONMENT FOR MENTAL DISORDER.

*To the Editor of* THE LANCET.

SIR,—Your readers may remember a letter from Dr. Frederick Dillon [1] drawing attention to the case of a lad who had accused himself of murder, and, after the police had searched in vain for the corpse, been discharged with a warning not to do it again. Dr. Dillon pointed out the risks attached to the absence of psychological investigation of such a case, and the validity of his contention was shown when the same youth later reappeared in court after an attempt at arson.

A similar need of psychological investigation is exemplified in to-day's papers. A young man, said to be the owner of a flourishing business, was sentenced at Hove police-court to 14 days' hard labour for the theft of a motor-cycle. His behaviour had been extraordinary, and apparently inexplicable, and the defence—carried on by his relatives without legal or medical aid—was "loss of memory." The newspaper accounts show that both the Mayor of Hove, who tried the case, and his clerk made kindly—but, of course, unsuccessful—efforts to obtain from the man an explanation of his conduct, and there seemed no alternative to imprisonment. The descriptions accord with a typical fugue state, which apparently still continues, and urgently demands skilled handling, but no one in connexion with the case seems to have had any conception of such a possibility. Nor would there be any certainty of more understanding if the man had been remanded for medical examination; for how many of us are sufficiently acquainted with modern psychological principles and technique to understand a fugue state? It would be wrong to blame the police or bench, and on the legal aspects of the case I can offer no opinion; yet, if my hypothesis is correct, it is distressing to think of this man being placed in prison with no hope of his mental condition being recognised or treated.

I am, Sir, yours faithfully,

London, W., August 7th, 1931. MILLAIS CULPIN.

[1] THE LANCET, 1930, ii., 770.

## TRAVELLING IN RUSSIA.

*To the Editor of* THE LANCET.

SIR,—It is only fair to warn any scientific man—especially a medical man—who proposes to go on a scientific tour organised by the Society for Cultural Relations with Soviet Russia to make sure in London before leaving that he will see that class of subject which interests him, because he will be on a "conducted" tour, where many names are called out, and where he is hurried from place to place. This, though interesting, does not deal with any particular subject. So far, I have seen nothing (according to programme) of medical interest. Though a medical man, starting with an assurance that I should see subjects of medical interest, especially, I am allowed to see only plants and laboratories, and to meet men with long and unpronounceable names, who have no connexion with medicine. Possibly things may be better later, but as we have no programme I cannot be sure. There was a programme, but it was not adhered to.

If there are any so-called "eminent" men in the party, even though in the minority, their subjects are attended to. The wishes of the majority count for nothing, and it is an extremely arduous and rough tour. Hence, unless the tourist's interests are similar to those of the big men the tour may not be worth it.

Beyond that, if interested in seeing what the country is doing, the tourist will have a very interesting time indeed. So far as culture goes, he can get far more in London. The S.C.R. looks after the tourists extraordinarily well, and with extreme patience. "Intourist" (the Soviet organisation for

touring parties) gives no assistance whatever, except to the big men, and I can get no information of routes, costs, or anything from it.

I am, Sir, yours faithfully,

W. F. COOPER, M.R.C.S., L.R.C.P.
(Kingston Hill, Surrey).

August 3rd, 1931.

## THE ADEQUATE TREATMENT OF SYPHILIS.

*To the Editor of* THE LANCET.

SIR,—I fear that by the time this reaches you the interest aroused by the discussion in your columns on the adequate treatment of syphilis may have evaporated. Certain aspects of the subject appear to me to be so important that I trust you will allow me a little of your valuable space.

With all respect, I am of opinion that the divergence of views expressed in the letters of Colonel Tyler Burke, Colonel Harrison, Mr. David Lees, and others is of little moment. Their letters suggest that there is a wholesome dread of arsenicals being likely to cause neuro recurrences, and claims are made that by the simultaneous or alternate administration of bismuth or mercury, or both, these risks are avoided.

The essential point is that the statistics given are not concerned with the end-results. I had the Medical Research Council's paper, No. 132, sent out to me in the hope that I should find some help and guidance, but was disappointed to find that it could give me no assistance.

In the early part of this year a three-day conference was held in Nairobi by the Kenya Branch of the British Medical Association to consider syphilis, and I was requested to open the discussion on treatment. I found myself in a very difficult position. I had to ask myself whether I could conscientiously advise an intensive campaign on the lines prescribed by the V.D. authorities in England, or should I rest satisfied with suggesting that attention should only be given to obviously contagious cases and to women who had had miscarriages which could be attributed to lues. I felt obliged to join issue with the controversialists and panicmongers, who write as if syphilis *remains* an infectious disease. No one with adequate experience doubts that infectivity does disappear. I am not forgetting that Warthin says that he has never found a case of cured syphilis at autopsy, but collections of spironemata in the aorta or meninges are a source of danger only to the patient. The Wassermann and other serological reactions are of little help, for contagion is present before there is a serum change, and positive reactions are present when the stage of infection has passed.

In this colony syphilis in the African is a mild disease. Tabes and G.P.I. are exceedingly rare, and Vint, in Kenya, and Webb and Holliday, in Uganda, have shown that aortic disease and aneurysm are much less common than in Europe. It may be taken for certain that few, if any, African patients have completed a course which the high authorities mentioned would consider "adequate," and a huge number of luetics have had no treatment at all. Yet the clinical results, so far as they can be ascertained, appear to be very close to those found by Bruusgaard in his analysis of the patients under the care of Prof. Cæsar Boeck, from 1890–1910, who were permitted to combat the disease solely by their tissue reactions, without any specific treatment. This analysis was made from 1925–1927.

Permit me to recall some of Bruusgaard's figures. He traced 471 of Boeck's patients. Of these, 164 had died. One-third of the fatalities were caused by pulmonary tuberculosis and cancer; 25 per cent. had succumbed to cardiovascular disease (a very large majority of these being between 40 and 60 years of age). There were only five deaths from G.P.I. and tabes. Of the 307 survivors, no fewer than 200 were symtom-free. Of these, 68 gave a positive Wassermann. My dilemma can be appreciated, and I finally decided that until we have end-results of cases "adequately" treated by modern methods it was impossible to make a dogmatic statement. It is now more than 20 years since "606" was introduced, and the time is ripe to start a systematic follow-up. If we can get accurate statistics of the fate of 1000 patients the subject will be in a very different position. In every case the condition of the cardiovascular and central nervous systems must be evaluated by experts. A serologist will also be necessary. These workers should be selected by the Medical Research Council, and should be free from the routine duties of a V.D. clinic.

Such statistics as are contained in Paper 132, and others referred to in the discussion, are of little interest outside the clinics where they were collected. We all know that early involvement of the central nervous system occurs, as amply proved by Parnell and Fildes, at Haslar, early in the war. Most of us know, however, that it is unlikely that G.P.I. or tabes will occur within the period of the observations of Colonel Harrison's assistants, and others. This is amply proved by a study of Bruusgaard's patients, who were observed up to 20 to 30 years after their infection. The same holds good in respect of cardiovascular disease.

Probably some of the statistics now available may be made the starting-point of the follow-up inquiry. If this were not so one could only regret that so much time and expense had been lavished upon them. Paper 132 is a case in point. Surely, it is unnecessary to investigate the occupation of male patients—in them, at least, syphilis is not an occupational disease—and the prevalence of congenital lues in paintmakers, photographers, or pianoforte-tuners has not even a sociological interest. But I suppose even the M.R.C. nods sometimes.

I am, Sir, yours faithfully,

JAMES H. SEQUEIRA, M.D.,
F.R.C.P. Lond., F.R.C.S. Eng.

Kenya Colony, B.E.A., July 15th, 1931.

## RECOVERY FROM STREPTOCOCCAL SEPTICÆMIA.

*To the Editor of* THE LANCET.

SIR,—I am quite sure that Dr. Ryle and myself are in complete agreement as to our aims. They are accurately stated and the position well summarised in your leading article on p. 252 of the issue in which his letter appears. Dr. Ryle has laid stress on clinical symptoms in a disease which I consider requires more investigation bacteriologically before we can correlate the symptoms and the nature of the bacterial infection. For instance, I am well aware that one or more of the symptoms which Dr. Ryle has called "a diagnostic syndrome," may occur in hæmolytic streptococcal infections, but before applying the term syndrome it is necessary to prove that the symptoms occur *collectively* in a large percentage of the cases. Within the last few weeks I have had two fatal cases of septicæmia. Neither had a single symptom of the syndrome, yet each had hæmolytic streptococci in the blood stream. Unless emphasis is laid on such cases as these we shall not get a blood

culture and a complete bacteriological examination made in every case of continued fever, which is the point which Dr. Ryle and I are both trying to insist upon.

If Dr. Ryle objects to my utilising the Guy's Hospital figures of six recoveries out of 21, because some of the patients had other grave diseases, I would refer him to the statement in his own article, that, after elimination of the five cases in which septicæmia complicated another disease, two-thirds of the remaining group died. This was enough to warrant the only conclusion we drew, viz., the high fatality-rate of streptococcal septicæmia. Obviously, the death-rate in a large hospital gives a more accurate representation of the death-rate generally than does a series of nine cases taken from a consulting practice.

Dr. Ryle now states that his conclusions with regard to sera were mainly in respect of the ordinary polyvalent serum. If by this he means the unconcentrated serum, it should be made quite clear that his warning with regard to crippling serum-sickness was only meant to refer to this unconcentrated serum, and does not apply to the concentrated sera which are now available, and which, with ordinary precautions, can be given, and are given, in large doses without deleterious effect.

I am, Sir, yours faithfully,

A. H. G. BURTON.

Public Health Offices, Ilford, August 7th, 1931.

## VEHICLES FOR CHEMICAL CONTRACEPTIVES.

*To the Editor of* THE LANCET.

SIR,—Your annotator on chemical spermicides (p. 257) would find much about the effects, knowledge of which he considers desiderata, in my book, "Contraception: Its Theory, History, and Practice." While something was said therein of the value of the greasy vehicle in contraceptives in the earlier edition, much more has been added in the greatly enlarged and reset edition, which appeared at the beginning of July, and to which it is extraordinary no reference is made either by your annotator or in Dr. Baker's letter.

Dr. Baker suggests that "the superiority of cocoala as a vehicle for chinosol is evident." Is this "a new fat," as Dr. Baker states? If this is the proprietary preparation which has long been known to those concerning themselves with the practical side of contraception, a sad disillusionment awaits the members of the medical profession who take Dr. Baker's assumption of its superiority without clinical test.—I am, Sir, yours faithfully,

MARIE C. STOPES,
President of the Society for Constructive Birth Control and Racial Progress.

Hindhead, Surrey, August 11th, 1931.

*** A review copy of the third edition of Dr. Marie Stopes's book (London: G. P. Putnam's Sons, pp. 487, 15*s*.) reached us on July 15th. A considerable amount of matter, devoted in the earlier editions to propaganda, has been omitted from this edition, and much interesting information is added upon recently popularised contraceptive methods. The author adheres to her original view that the best available method for normal and healthy women is the rubber cervical cap. For women suffering from uterine displacements and abnormalities of the cervix she recommends a flat rubber sponge, some three-quarters of an inch thick, soaked in olive oil, which the woman is advised to boil for two minutes in salt water after use.—ED. L.

## CANCER-PRODUCING SUBSTANCES.

*To the Editor of* THE LANCET.

SIR,—In view of certain statements which have appeared in the press, the authorities of the Cancer Hospital (Free), Fulham-road, wish to state that no announcement of any kind referring to cancer-producing substances has been issued from this hospital since their official report to the British Empire Cancer Campaign, which was presented at the annual meeting of the Campaign on July 20th. In this report (pp. 33–42) no claim is made that the cancer-producing substance present in tar has been identified.—I am, Sir, yours faithfully,

J. COURTNEY BUCHANAN,
Secretary.

Cancer Hospital, Fulham-road, London, S.W., August 12th.

*** Recent work at the Cancer Hospital on carcinogenetic substances was noticed in an annotation on p. 197 of our issue of July 25th.—ED. L.

# THE SERVICES

### ROYAL NAVAL MEDICAL SERVICE.

Surg. Lt.-Comdrs. G. Kirker to *Durban*; J. Hamilton to *Britannia*; and J. Cussen to *Sandwich*.

Surg. Lt.-Comdrs. (D.) A. MacPherson to *Victory*, for Haslar Hosp.; A. Lawrey to *Ganges*; and R. R. Adams and R. S. Ward to *President*, for three months' dental post-graduate course.

Surg. Lt. (D.) H. V. Pell to *Victory XI.*, for R.N. Hosp., Portland, tempy.; F. J. Goldsworthy (actg.) to *Vivid*, for Devonport Barracks; and J. C. Benson (actg.) to *Victory*, for Portsmouth Barracks.

### ROYAL ARMY MEDICAL CORPS.

Maj. and Bt. Lt.-Col. T. J. Mitchell retires on retd. pay and is granted the rank of Lt.-Col.

Maj. (temp. Lt.-Col.) F. Casement to be Lt.-Col.

Maj. E. M. Middleton to be temp. Lt.-Col.

Lt. J. W. Kendall to be Capt. (prov.).

### ROYAL AIR FORCE.

Flying Officer E. W. B. Griffiths is promoted to the rank of Flight-Lt.

## INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED AUGUST 1ST, 1931.

*Notifications.*—The following cases of infectious disease were notified during the week:—Small-pox, 26 (last week 36); scarlet fever, 1416; diphtheria, 831; enteric fever, 60; pneumonia, 464; puerperal fever, 37; puerperal pyrexia, 114; cerebro-spinal fever, 34; acute poliomyelitis, 13; acute polio-encephalitis, 1; encephalitis lethargica, 14; dysentery, 24; ophthalmia neonatorum, 109. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on August 4th–5th was as follows: Small-pox, 54 under treatment, 2 under observation (last week 58 and 2 respectively); scarlet fever, 1216; diphtheria, 1481; enteric fever, 12; measles, 147; whooping-cough, 379; puerperal fever, 35 (plus 4 babies); encephalitis lethargica, 211; poliomyelitis, 1; "other diseases," 130. At St. Margaret's Hospital there were 15 babies (plus 6 mothers) with ophthalmia neonatorum.

*Deaths.*—In the aggregate of great towns, including London, there was no death from small-pox or enteric fever, 18 (2) from measles, 4 (1) from scarlet fever, 16 (3) from whooping-cough, 22 (4) from diphtheria, 41 (10) from diarrhœa and enteritis under two years, and 11 (0) from influenza. The figures in parentheses are those for London itself.

Four of the deaths from measles were reported from Barnsley; 4 of those from whooping-cough from Liverpool. Diarrhœa was credited with 5 deaths at Liverpool; 4 at Manchester.

The number of stillbirths notified during the week was 275 (corresponding to a rate of 40 per 1000 births), including 57 in London.

# PUBLIC HEALTH SERVICES

## PORT SANITARY AUTHORITY.

Dr. W. F. Dearden, in his twenty-fifth annual report to the MANCHESTER PORT sanitary authority, mentions that no case of cholera, plague, or yellow fever appeared, that three cases of scarlet fever were removed to hospital, and that single cases of malaria, dysentery, pneumonia, and tuberculosis were treated on board. One child, with scarlet fever, was sent to hospital from a canal boat. On board ships 915 rats were destroyed (the average number per ship was 2½ in 1930, 5½ in 1929, so rats are decreasing on ships), and 2332 on shore; 31 examined were found free of plague. Of the 877 tons of food condemned, 682 were apples, mostly on account of "brown heart," being death of tissue from interference with respiration. Inspection of 1976 ships showed that 502 had defects, 116 forecastles requiring cleaning and painting. There were 85 defects in water-closets, 76 in ventilation, 81 in lighting, 50 in heating, 57 in water storage, while 33 forecastles were verminous. Defects were more numerous in British (30 per cent.) than in foreign ships (15). The crews of vessels inspected averaged 26 men. The chief reported defects in canal boats were leakages into cabins. Like other port medical officers, Dr. Dearden finds better accommodation for seamen on foreign ships than on British ships, especially on new vessels. Having examined 88 British ships and 52 foreign, all built since 1926, he found that the crews' quarters were aft in 76 per cent. foreign, but only in 42 per cent. British; there were washplaces and bathrooms in 76 per cent. foreign and 55 per cent. British, messrooms and hospitals in 94 per cent. foreign, and in barely half of the British ships, the reason being that improved accommodation is compulsory abroad, but at home is recommended only by the Board of Trade, which has no power to compel compliance. It is said, he remarks, that shipping cannot stand fresh financial burdens, but (he asks) would burdens be materially increased if ships were properly planned from the start, and, alternatively, if burdens are thus increased, how do the ships of small nations bear them and still compete with our shipping, which escapes them? He hopes the Board of Trade and Ministry of Health will combine to get statutory authority to make regulations requiring a certain type of accommodation for sailors on British ships. At the same time, suitable water storage should be ordered, and sanitary dust-bins for ships in dock, not coal-burning, and so unable to dispose of their own kitchen refuse. Shipowners and others have recently been conferring about crews' living quarters, and a month ago the President of the Board of Trade stated that the Board would take such action as lay within its power to give effect to their recommendations. If we have correctly understood Dr. Dearden's report, that will leave matters precisely where they are.

## MENTAL HOSPITAL REPORTS.

The CITY OF CARDIFF MENTAL HOSPITAL had 749 patients in residence on the first day of this year. The death-rate for the year was 7·7 per cent., and the recovery-rate 39·9 per cent., despite the high percentage (21·7) of admissions for general paralysis—accounted for by the high incidence of syphilis in the seaport. The general health was good, and there was no infectious disease, except one case of scarlet fever, one of erysipelas, and four of tuberculosis. All new female cases were discussed with the gynæcologist, and those whose symptoms pointed to any gynæcological condition were examined by him. A large number of patients were submitted to routine ear, nose, and throat examination, and a certain amount of sepsis was discovered and removed, without, however, any very striking psychical improvement. The dentist attended regularly throughout the year and examined over 500 patients. The consulting surgeon performed three major operations. In the biochemical laboratory a number of interesting pieces of research are being carried on, including work on the carbohydrate and nitrogen metabolism of the psychotic, the psycho-galvanometer, oxidation in the brain, somatic changes, the blood coagulation time, and gynæcological and menstrual conditions in the psychoses. Malarial therapy has been continued, and the results show a discharge-rate of 33·3 per cent. and a benefit-rate of 46·9 per cent. Continuous baths and ultra-violet light treatment have been used together and have seemed to enhance each other. The occupational therapy department has been kept busy. The best occupations officer, in the opinion of this hospital, is the mental nurse with a knowledge of arts and crafts. Some 80 per cent. of the women and 70 per cent. of the men are employed in useful tasks. All ground-floor wards are administered on the open-door principle, and patients in non-observation wards now do not go to bed until 9 P.M., after a light supper. There are 76 men and 111 women on parole, and during the year 162 patients were granted leave of absence on 1374 occasions. After-care work is carried on in coöperation with the Cardiff League of Social Services, but the Medical Superintendent looks to the day when the hospital will have its own full-time social worker. The out-patient clinic at the Cardiff Royal Infirmary has had to open a second weekly session; 82 new patients attended last year. Two unqualified resident clinical assistantships are now available for final year students, and this experiment has proved a great success. During the year five nurses obtained the final certificate of the General Nursing Council. This hospital is in the enviable position of always having a waiting list of suitable applicants for probation.

The EAST RIDING MENTAL HOSPITAL at BEVERLEY had 610 patients under care on March 31st last. The recovery-rate for the preceding year was 25 per cent., and the death-rate 8·54 per cent. Autopsies were performed in all cases where permission was given—i.e., 96 per cent. Confusional and excited cases are treated by hydro-therapeutic methods with very satisfactory results, and general paralytics, who fail to respond to tryparsamide, are treated with malaria. The dental surgeon visits regularly and examined 161 patients during the year. Parole was granted to 46 patients. A laboratory has been established and equipped, and arrangements have now been made to house the mentally defective children elsewhere. Plans for a new nurses' home have been approved. The staff consists of 39 men, 21 of whom hold the R.M.P.A. certificate, and 38 women, of whom four are certificated.

The HEREFORD COUNTY and CITY MENTAL HOSPITAL at BURGHILL housed 545 patients at the end of last year. The recovery-rate for the year was 25 per cent., and the death-rate 5 per cent.; post-mortem examinations were held in 59 per cent. of the fatal cases. The visiting dentist extracted 363 teeth. The general health was good, and there was no infectious disease, except two cases of erysipelas and one of diphtheria. Parole within the grounds is granted to 29 men and 11 women, and six men are allowed outside the estate. One male and two female wards are "open door," and periods of trial are practically always given before discharge, though not very often with a money allowance. Of the nursing staff of 72, 11 men and 14 women are certificated or registered, but considerable difficulty is experienced in procuring candidates.

At the JOINT COUNTIES MENTAL HOSPITAL for the Counties of CARMARTHEN, CARDIGAN, and PEMBROKE there were 652 patients on March 31st last; the hospital is overcrowded. The recovery-rate for the year was 33·3 per cent., and the death-rate 11·9 per cent. The general health caused some anxiety, as

influenza was very prevalent, and there were 19 cases of diarrhœa or enteritis, 6 of tuberculosis, and 23 of peripheral neuritis—the cause of which is still obscure. The dentist visits weekly, and treated 160 patients, but the absence of electricity in the institution deprives the patients of many modern methods of treatment. A new hot-water system has been installed, and a new verandah is being built. The visiting commissioners urge the advisability of allowing more patients out on trial before discharge, and of granting money allowances. A laboratory is to be fitted up. Two nurses passed the final examination for the R.M.P.A. certificate during the year.

There were 796 men and women on the books of the DOWN COUNTY MENTAL HOSPITAL at DOWNPATRICK at the end of last year. The recovery-rate for the year was 31·1 per cent., and the death-rate 7 per cent. An electro- and hydro-therapeutic equipment is to be added to the hospital, and occupational therapy has already developed considerably, 60 per cent. of the patients being usefully employed. Stress is laid on the manufacture of useful articles, tweeds and linen, for instance. Seventy members of the nursing staff hold the R.M.P.A. certificate.

The MONMOUTHSHIRE MENTAL HOSPITAL at ABERGAVENNY had 1206 patients on its register at the end of last year. This hospital is one of the few in which the male patients outnumber the female. The recovery-rate for the year was 35·3 per cent., and the death-rate 6·3 per cent. There was no outbreak of infectious disease, but sporadic cases of chronic dysentery and tuberculosis came under care. An out-patient clinic has been established at the Royal Gwent Hospital, at Newport, and 84 new patients were treated during its first year of work. The Medical Superintendent hopes that Maindiff Court will soon become a modern admission and convalescent villa in the sense of the new Act. Plans for a nurses' home have been submitted to the Board of Control. The dentist visited weekly, and extracted 249 teeth during the year. The visiting surgeon was called in consultation ten times, and performed eight operations. Fifty-six men are allowed parole beyond the estate, and 85 men and 26 women are free within the grounds. An X ray apparatus has been installed, and general paralysis is to be treated by induced malaria. Of the 152 members of the nursing staff, 39 men and 20 women are certificated or registered, eight having passed the final examination for the nursing certificate during the year.

### PRIVATE MENTAL HOSPITALS.

The report of THE RETREAT, YORK, is illustrated, as usual, by charming pencil drawings. During the year 116 patients were admitted, 110 discharged, and 20 died, the number on the books on Dec. 31st, 1930, being 206. Of those admitted during the year, 64 per cent. were on a voluntary basis. The recovery-rate was 37·8 per cent., and the death-rate 8·5 per cent. The Medical Superintendent, in common with every one of his colleagues this year, discusses the Mental Treatment Act, but, in addition to his welcome of the measure, he expresses considerable disquietude at the lack of alteration in the popular attitude towards the mentally ill. As far as he can see, recognition of the modern trend of thought is only made by those most intimately concerned, and there is serious need for a rapid change in the popular conception of mental illness and its treatment. The general health at the Retreat during the year was very satisfactory. The occupational therapy department, under its whole-time instructor, provides every kind of work, and is gathering more and more patients into its happy activity. A seaside house was again taken for the summer. A seven-seater motor-car has been bought to take patients for excursions into the country; it is in regular use every morning and afternoon. Garrow Hill is being altered to form a nursing home, to be run in connexion with the Retreat. The visiting commissioners suggest the installation of an X ray apparatus. Six gentlemen and 12 ladies have parole beyond the grounds, and seven gentlemen and 16 ladies within the grounds. During the year three nurses passed the final examination of the General Nursing Council. Nine female nurses are employed nursing male patients.

The 104th annual report of JAMES MURRAY'S ROYAL ASYLUM, PERTH, illustrated by photographs, records a successful year of progress. There were 178 patients on the register on March 31st last, the ratio of voluntary to certified patients admitted being 40:24. The new detached hospital block—Gilgal Hospital—has been completed and is now open for voluntary patients, suffering from slight or brief neuropathic or psychopathic disorders, who are sensitive or apprehensive about association with invalids of a different type. The building has been equipped in the most modern style. Each ward unit consists of a dormitory with 8 to 11 beds, a day room, dining room, six private rooms, three observation private rooms, two bath rooms, with a continuous bath, a clinical treatment room, a verandah, and offices. The death-rate at the James Murray's institution last year was 8·1 per cent., and post-mortem examinations were made in five out of the 14 cases. Of the 50 patients discharged during the year, 21 were recovered and 26 relieved. The damage done by the fire in April, 1930, has now been made good, and the whole system of water-mains has been renewed. The commissioners comment with gratification on the amount of parole allowed. During the year four nurses and two attendants obtained the R.M.P.A. certificate, and three nurses and one attendant passed the final examination of the G.N.C. The hospital has reluctantly abandoned the examinations of the R.M.P.A., as that certificate does not entitle the holder to a place on the State register.

At BARNWOOD HOUSE, GLOUCESTER, there were 139 certified patients and 17 voluntary boarders on Dec. 31st, 1930. The hospital has been very full on the female side, but there have been fewer men admitted than during previous years. Had there been more accommodation there would probably have been many more voluntary patients. The recovery-rate for the year was 57·7 per cent., and the death-rate 5·04 per cent. The discharges included one case of general paralysis treated by induced malaria. The general health was good, and there were but few cases of influenza. A permanent occupations officer has been appointed, and it is hoped that this department will develop. Parties were taken to the seaside in the summer and accommodated at a large private hotel. Pathological work is carried out at the Gloucestershire Royal Infirmary. The cinema installation is now in working order and is very popular. An ultra-violet ray installation has been supplied. Twelve patients have full parole beyond the grounds, and 12 more within the grounds. During the year seven nurses passed the final examination of the R.M.P.A., bringing the total certificated to 78 per cent. of the men and 35 per cent. of the women.

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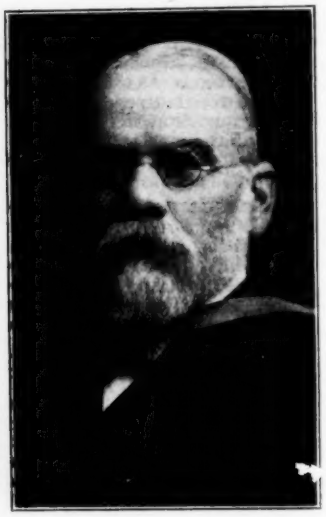
ENLARGEMENT OF WELLHOUSE HOSPITAL.—A new block, containing two theatres, has just been added to this poor-law institution at Barnet, which is the largest hospital in Hertfordshire. The cost of erection and equipment was £13,000.

HOSPITAL EXTENSIONS.—The Duke of Connaught recently opened, without ceremony, two new wards at the Children's Hospital, Hampstead.—A fortnight ago Lord Apsley reopened Cirencester Memorial Hospital after its enlargement at a cost of £14,000. The work includes the addition of 14 beds, making a total of 42, with accommodation for another 14 in an emergency, the improvement of the private wards, and additions to the domestic amenities.—About the same time Viscountess Allendale opened the new women's wing of the Wakefield Clayton Hospital. The wing, which contains 48 beds, is the gift of Mr. S. Canning Childs, of New Jersey, U.S.A., who is a native of Wakefield, in memory of his mother. This latest benefaction of Mr. Childs, who was present at the ceremony, brings the value of his gifts to Wakefield to £63,500.

# OBITUARY

## DONALD MACPHAIL, M.D., F.R.F.P.S. Glasg.

Dr. Donald Macphail, who died on August 2nd, at the age of 77, had been living at Hamilton since he retired from his practice at Coatbridge, Lanarkshire, some seven years ago. He was a graduate of Glasgow University, and on qualification in 1877 took up house appointments at the Western Infirmary under Sir William Gairdner and Sir George Macleod. After a year as resident assistant physician at the Belvidere Fever Hospital he began to practise in Glasgow, and became assistant to Sir George Macleod, then Regius professor of surgery. From early student days he had been an earnest worker, and in association with the late Dr. David Newman and Prof. Joseph Coats he was responsible for starting what afterwards became the clinical and pathological laboratory of the Western Infirmary. Here and elsewhere the scientific trend of his thoughts was clearly evident. When still an undergraduate and president of the University Medico-Chirurgical Society he selected Darwin's "Origin of Species" as the theme of a presidential address at a time when evolution was barely clear on the horizon. In the pathological laboratory he made inquiry into the chemical composition of diseased bone, and devised an ether percolator which economised both time and material. While at Belvidere, he undertook a review of the hospital figures for the eight years preceding 1879, in order to elucidate the seasonal fluctuations of typhus and enteric fever, and the movement in their mortality-rates. To this subject he returned in the *Glasgow Medical Journal* for 1893, in order to demonstrate the possible fallacies of comparing different modes of treating enteric fever without reference to the natural fluctuations in the severity of the disease. To the *Proceedings* of the Pathological and Clinical Society of Glasgow, now merged in the Royal Medico-Chirurgical Society, he was a frequent contributor.



DR. DONALD MACPHAIL.

[*Photograph by Annan.*

Most of Dr. Macphail's life, however, was to be spent in general practice, and within a couple of years he had left Glasgow for Coatbridge, to become surgeon to the employees of two of the large ironworks for which the district is famous. As works' surgeon he began courses of first-aid and ambulance training, which were at that time a novelty, and this was a branch of his activities which he followed for very many years both as a lecturer and examiner. Of his principal occupation it is less easy to write. "To the family doctor, whose energies are wholly absorbed in his work," writes a colleague, "the goal is reached when he wins the friendship and esteem of his patients, and this Dr. Macphail earned and won in full measure. Innate modesty made him indifferent to an evanescent popularity, but the solid esteem in which he was held by his fellows was shown many years ago when, on the opening of the Alexandra Hospital, Coatbridge, he was appointed one of the first operating surgeons. On retirement from practice he was entertained at a public dinner by his fellow-practitioners and other friends, and a few years ago he was elected, without examination, to the Fellowship of the Royal Faculty of Physicians and Surgeons." Outside his work he was a highly accomplished pianist, and took pleasure in sketching.

Dr. Macphail's family, in the present generation, has been closely connected with medicine. A younger brother, Dr. James Macphail, went as medical missionary to the Santals, and his work is now being continued by his nephew. Another brother is Dr. Alexander Macphail, of the Ministry of Health, while yet another, Dr. John Macphail, practised at Barnsley, Yorkshire, until his death a few years ago. One of his daughters, Dr. Katherine Macphail, was the founder, and is now director, of the British Hospital for Children at Belgrade, Yugoslavia.

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## JOHN ROBERT LORD, C.B.E., M.D., F.R.C.P. Edin.

WE regret to announce the death, on Sunday last, after a brief illness, of Lieut.-Colonel J. R. Lord, medical superintendent of Horton Mental Hospital, within a day or two of his 57th birthday. By his death psychiatry loses an ardent and valued worker.

John Robert Lord was born at Blackburn in 1874, and educated at the Grammar School there, and later at Owens College. He went on to Edinburgh for his medical studies, during which he organised the University battery of the City Artillery. After qualifying M.B., C.M. in 1896, he became assistant demonstrator in pathology at the School of Medicine. He took his M.D. in 1926 and also the M.R.C.P. Edin., being elected a Fellow of the college in the same year. Under the influence of Clouston he became interested in the study of psychological medicine, and in 1897 held his first appointment as assistant at Carmarthen Mental Hospital to Dr. Edwin Goodall, with whom he kept up a life-long association. In 1898 he entered the mental hospital service of the London County Council, first at Hanwell, and then at Bexley, where he was deputy superintendent. Full charge came to him at the early age of 33, when he

COLONEL LORD.

[*Photograph by Claude Harris.*

was appointed superintendent of Horton Mental Hospital, Epsom. From this time on his whole life and activities centred round the study of mental disorders, with the exception of the years 1915–1919, when he was officer commanding the Horton War Hospital, during which time 45,000 officers and other ranks received treatment. He rose to the rank of Lieut.-Colonel, R.A.M.C., was mentioned in despatches, and received the C.B.E.

Colonel Lord made many contributions to the branch of medicine in which he specialised. His early work was on epilepsy and the study of the pineal gland, along with some anthropometrical research. He was bronze medallist of the Royal Medico-Psychological Association, and his literary contributions dealt with Social Workers and the Insane, the Clinical Study of Mental Disorders, Mental Hospitals and the Public, and the Evolution of the Reception Orders for Mental Patients in England and Wales. At Horton, Colonel Lord was able to put into practice many of his ideas. He was a pioneer in the development of the villa system, and extended it to convalescent villas; he organised a modern type of admission hospital, established one of the first occupation therapy centres, and coöperated with the Ministry of Health in the founding of a malaria therapy centre for the treatment of general paralysis. His work for the Medico-Psychological Association was of outstanding value. From 1900 he was assistant editor of the *Journal of Mental Science*, becoming co-editor in 1911, his keenness contributing largely to bringing that journal to its present high scientific standard. In 1926, after serving for many years on its council, Colonel Lord was elected president of the association, and, as a result of his inaugural address, a research and clinical committee was formed, with himself as chairman. Whilst giving time and energy without stint to work on this and the educational and parliamentary committees, Colonel Lord, during the last ten years, found wider outlet for his activities. He was honorary secretary of the National Council for Mental Hygiene, and latterly a member of the General Nursing Council. In 1930 he went to America to attend the first International Congress for Mental Hygiene. He was elected an honorary member of the Belgian and French psychological societies. In 1928, under the affiliation scheme, he was made lecturer in mental diseases to the London (R.F.H.) School of Medicine for Women.

At Horton, Colonel Lord was regarded as an administrator of outstanding ability; he certainly realised his aim of making the hospital rank among the foremost of mental hospitals. "Those of us who had the privilege of working under him," writes Dr. W. D. Nicol, "found him a good chief and a generous friend. It was in 1920 that it was first discovered that he was a sufferer from diabetes, and his courage in the face of great odds was admirable. He not only overcame his disabilities, but he managed to get the best out of life, and he will be remembered as one who did a great work in the cause of psychiatry. It will be difficult to think of this hospital without him."

Colonel Lord found his relaxation in foreign travel and at home in growing roses. In March of this year he married Miss Ruby Carr, an Edinburgh medical graduate on the Horton Hospital staff, with whom he shared his many interests.

# MEDICAL NEWS

## Royal Colleges of Physicians of London and Surgeons of England.

At the Final Examination of the Conjoint Board, held from July 6th to 28th, the following candidates were approved in the subjects indicated, but are not eligible for the diplomas of the colleges:—

*Pathology.*—H. Ackers, Liverpool; H. Agar, Leeds; C. F. S. Alken, Middlesex; G. T. Allen, St. Thomas's; G. N. Barker, St. Thomas's; Mavis W. M. Beddall, Univ. College; H. Blumovitch, St. Bart.'s; G. H. Brookman, St. Bart.'s; D. G. W. Brown, Liverpool; W. Bullock, Liverpool; V. Constad, Guy's; H. V. Corbett, Liverpool; T. A. L. Davies, St. Thomas's; A. H. Dunkerley, Camb. and Manchester; G. E. Dunkerley, Univ. College; F. R. Edwards, Liverpool; G. M. Evans, Bristol; T. A. Gavin, Guy's; K. J. Gilchrist, Guy's; A. M. Gill, Middlesex; J. H. L. Gilmore, M.A. Camb. and St. Thomas's; G. P. Gladstone, London; F. J. S. Gowar, Middlesex; M. Hafezi St. Mary's; R. J. C. Hamilton, St. George's; H. G. Hanley, Liverpool; Helen A. Hatrick, Univ. College; W. N. Hine, Middlesex; L. A. Hiscock, St. Bart.'s; R. A. P. Hogbin, Guy's; A. Hollingsworth, St. Thomas's; M. S. Holzman, London; A. C. Howard, Univ. College; D. H. Irish, Guy's; W. A. Johnson, St. Mary's; T. B. Jones, Westminster; W. H. Jones, Manchester; W. W. Jones, Guy's; E. Kaminsky, Univ. College; K. D. Keele, St. Bart.'s; J. J. Kempton, Bristol; A. Kennedy, St. Thomas's; L. O'N. Knox, Guy's; W. Kravchick, St. Bart.'s; L. W. Lauste, St. Thomas's; I. Levy, Guy's; J. R. M. Martin, St. Bart.'s; J. A. W. Miller, Guy's; M. A. N. Moezuddin, St. Thomas's; J. de C. Muller, St. Thomas's; Irene P. Murray, King's Coll.; P. H. Nankivell, Middlesex; W. T. North, Guy's; R. S. Ogborn, Univ. College; G. B. Palmer, L.D.S., Guy's; J. S. Parkinson, Manchester; R. H. Patel, Birmingham; S. Paul, Guy's; Norah W. K. Petter, Royal Free; W. S. Pitt-Payne, Guy's; C. B. R. Pollock, Guy's; V. T. Powell, Cardiff and Guy's; F. Radcliffe, Camb. and St. Bart.'s; J. C. Read, L.D.S., Guy's; R. G. Reid, Guy's; D. F. Robb, St. Thomas's; P. G. Roberts, St. Bart.'s; R. D. Roper, Camb. and St. Bart.'s; A. Rothwell, Camb. and King's Coll.; H. W. Salmon, Middlesex; O. A. Savage, St. Bart.'s; G. C. Sawver, Guy's; R. T. Shipman, St. Thomas's; P. Q. M. Spaight, St. Bart.'s; K. W. Stroude, Liverpool; D. J. Swamy, Durham; S. K. K. Sze, Camb. and St. Thomas's; J. R. Thornton, St. Thomas's; E. Troensegaard-Hansen, Charing Cross; A. A. M. Wajih, Charing Cross; A. R. Walters, Middlesex; Clara M. Warren, Royal Free; H. Waterman, Leeds; S. W. Wright, Guy's.

*Medicine.*—S. S. Alam, M.B. Punjab; A. B. Anderson, Ph.D. Camb., Univ. College; A. Ascher, King's Coll.; T. J. Ashley, Cardiff; G. Ashton, Oxford and Univ. College; M. Bloom, Manchester; H. Blumovitch, St. Bart.'s; L. Bowen, St. Bart.'s; J. R. Braybrooks, Oxford and King's Coll.; I. Cohen, King's Coll.; H. W. Cowen, Camb. and Univ. College; R. A. F. Creet, St. Thomas's; A. S. V. Daniels, L.D.S., Westminster; S. C. De., M.B. Calcutta; Jennie G. Evans, Westminster; F. R. Glover, London; R. A. E. Hammond, Camb. and Guy's; Joan G. Harcourt, Royal Free; Florence D. Hawes, Royal Free; Doris I. Howell, Charing Cross; E. Kaminsky, Univ. College; B. L. Kapur, M.B. Punjab, Univ. College; K. D. Keele, St. Bart.'s; Victoria H. King, Royal Free; H. H. Langston, St. Bart.'s; O. C. Levine, Univ. College; J. MacDonald, M.B. Glasg.; J. A. S. Marr, M.B. Cape, Middlesex; J. R. M. Martin, St. Bart.'s; Oonah L. Matthews, Univ. College; M. T. Maung, M.B. Rangoon, Guy's; I. D. Monger, Wales and Charing Cross; Elisabeth J. Morris, Liverpool; D. R. Narang, M.B. Punjab, London; H. D. Owen, Liverpool; E. Palmer, Camb. and King's College; T. J. Phillips, Univ. College; Pushpawati, Punjab and Royal Free; G. Ramage, M. B. Manchester; B. Roberts, Univ. College; J. Rosenberg, Guy's; M. G. Ross, Leeds; C. R. Sadler, Camb. and St. Thomas's; I. N. Samuel, Middlesex; Marie W. E. Schuyt van Castricum, Royal Free; C. K. Shain, Leeds; J. W. V. Sheldon, Guy's; H. M. Singer, King's Coll.; D. Stone, Cardiff and Guy's; I. Sutton, M.B. Manch.; W. S. Tegner, Oxford and London; C. H. T. Wade, M.B. Manch.; A. A. M. Wajih, Bengal and Charing Cross; W. W. Walther, Univ. College; H. C. M. Walton, Camb. and St. Mary's; R. A. Wesson, Univ. College; L. E. Williams, Univ. College; D. S. P. Wilson, Dublin; H. T. S. Wise, King's College.

*Surgery.*—G. T. Allen, St. Thomas's; E. T. Bannister, Univ. College; F. J. Beilby, St. Bart.'s; E. A. R. Berkley, Guy's; J. B. Bishop, Oxford and St. Thomas's; H. W. Boake, Camb. and St. Thomas's; H. E. Bonnell, King's Coll.; C. P. F. Boulden, Camb. and London; F. J. Burke, Liverpool; T. A. R. Callender, London; M. Chalkowski, St. George's; T. Chandrasekharan, L.M.S.S.A. Madras; N. E. D. de Silva, Univ. College; C. D. Evans, Camb. and St. Mary's; M. Farooq, St. Bart.'s; J. W. H. Foy, Liverpool; H. T. Giblin, Calcutta and St. Mary's; A. C. Gladstone, St. Thomas's; L. E. Green, St. Bart.'s; R. A. E. Hammond, Camb. and Guy's; Elizabeth M. Handfield-Jones, Oxford; Joan G. Harcourt, Royal Free; Margaret Hardwick, Leeds; W. P. Hedgcock, St. Thomas's; L. A. Hiscock, St. Bart.'s; A. C. Howard, Univ. College; J. Howell, Camb. and Guy's; S. V. Humphries, Camb. and St. Thomas's; W. Hunt, Camb. and St. Bart.'s; Daisy G. Iliff, King's Coll.; J. M. Jackson, St. Bart.'s; N. D. Jekyll, Camb. and London; D. E. V. Jones, King's Coll.; R. A. Jones, Camb. and London; E. Kaminsky, Univ. College; Florence E. Kingsley, Westminster; E. A. Knappett, Univ. College; Annie Lawson, Leeds; F. Livesey, M.B. Manchester; J. M. Low, St. Mary's; J. G.

McGrath, Manchester; J. G. Madden, Middlesex; W. A. Mayne, Camb. and St. Thomas's; C. F. Mayo-Smith, St. George's; T. F. Miles, St. Thomas's; P. H. Nankivell, Middlesex; N. C. O'Byrne, St. Thomas's; R. S. Ogborn, Univ. College; M. W. C. Oldfield, Oxford and Leeds; W. H. Owles, Oxford and Guy's; A. Papert, St. Bart.'s; R. C. T. Pearson, Camb. and St. Thomas's; G. R. C. Rayner, Camb. and Guy's; G. O. S. Reid, St. Mary's; I. C. Robertson, Camb. and St. Thomas's; I. Sutton, M.B. Manchester; J. C. S. Thomas, St. Bart.'s; Clara M. Warren, Royal Free; H. A. T. Wells, Madras and Guy's; Shirley E. Whitaker, Univ. College; F. C. H. White, Camb. and St. Bart.'s; D. S. P. Wilson, Dublin; J. M. Wingfield, Birmingham and St. Mary's; C. E. R. Wood, Camb. and Guy's; F. H. Wood, Birmingham.

*Midwifery.*—E. L. Allen, St. Bart.'s; A. B. Anderson, Ph.D. Camb., Univ. College; R. Baker, Leeds; E. T. Bannister, Univ. College; F. H. E. Beckett, Guy's; H. L. Beckitt, London; J. G. Billington, Camb. and St. Thomas's; C. P. F. Boulden, Camb. and London; L. Bowen, St. Bart.'s; G. H. Brookman, St. Bart.'s; F. E. Buckland, Oxford and St. Georges; J. D. Burrows, St. Thomas's; J. W. Campbell, Camb. and St. Bart.'s; N. G. Chitnis, Bombay and Dublin; J. G. R. Clarke, St. Thomas's; T. A. Connold, St. Thomas's; P. T. Cooper, Camb. and St. George's; F. N. Corfe, L.D.S., Guy's; D. R. Crabb, St. Bart.'s; G. W. Crimmin, Camb. and St. Thomas's; Elizabeth Curphey, Westminster; A. R. Cutlack, St. Bart.'s; A. S. V. Daniels, L.D.S., Westminster; A. L. Davies, Middlesex; A. M. Davies, Bristol; R. P. Davies, L.M.S.S.A., Cardiff and London; W. H. D. Davies, St. Bart.'s; D. C. De Wet, St. Thomas's; A. H. Dunkerley, Camb. and Manchester; Q. F. Evans, St. Thomas's; K. Fawssett, St. Thomas's; L. P. Fitch, St. Thomas's; G. H. Gibbens, St. Thomas's; T. Gibson, St. Thomas's; A. M. Gill, Middlesex; G. P. Gladstone, London; F. J. S. Gowar, Middlesex; R. D. Green, London; C. S. Hall-Smith, Camb. and St. Bart.'s; C. F. Hamilton-Turner, Oxford and St. George's; Margaret Hardwick, Leeds; P. L. S. Hatton, St. Bart.'s; R. F. Hawke, London; S. T. Hayward, St. Bart.'s; K. H. C. Hester, London; A. Hollinrake, St. Bart.'s; J. M. Holmes, Leeds; M. S. Holzman, London; W. B. Howell, St. Mary's; A. G. James, Leeds; R. James, St. Mary's; W. L. James, Guy's; D. J. Johnson, Camb. and St. Bart.'s; E. T. Jones, Cardiff and London; R. A. Jones, Camb. and London; B. L. Kapur, M.B. Punjab, Univ. College; Agnes V. Kelynack, Royal Free; J. J. Kempton, Bristol; A. Kennedy, St. Thomas's; W. Kravchick, St. Bart.'s; L. W. Lauste, St. Thomas's; O. C. Levine, Univ. College; J. T. R. Lewis, Middlesex; W. H. Lewis, Camb. and Guy's; M. B. Lindsay, St. Thomas's; F. Livesey, M.B., Manchester; S. Livni, London; Monica Low, Royal Free; Ethelberta M. Lynton-Low, Royal Free; D. C. McClure, London; I. A. MacDougall, Guy's; N. F. Maclagan, Middlesex; J. A. S. Marr, M.B. Cape, Middlesex; P. G. C. Martin, Camb. and Manchester; J. N. Matthews, Liverpool; F. S. A. Maw, Camb. and King's Coll.; G. J. Meikle, Camb. and Middlesex; R. V. F. Mercer, Camb. and St. Bart.'s; W. H. W. Morris, St. Thomas's; Edith A. Muirhead, Royal Free; J. de C. Muller, St. Thomas's; C. G. Nicol, L.M.S.S.A., St. Mary's; R. C. T. Pearson, Camb. and St. Thomas's; J. C. Pedley, Middlesex; M. C. Perkowski, Middlesex; F. W. J. Platts, Camb. and King's Coll.; C. R. D. Porter, Middlesex; T. W. H. Porter, Oxford and Middlesex; V. T. Powell, Cardiff and Guy's; K. C. Priddy, London; F. Radcliffe, Camb. and St. Bart.'s; G. Ramage, M.B. Manchester; H. M. Rashid, Birmingham; E. R. B. Reynolds, St. Thomas's; M. G. Ross, Leeds; H. W. Salmon, Middlesex; H. B. C. Sandiford, St. Thomas's; M. H. P. Sayers, St. Thomas's; S. B. H. Saunders, Camb. and St. Bart.'s; M. Shankhla, Leeds; J. R. S. Sharp, Guy's; R. T. Shipman, St. Thomas's; K. Singh, St. Thomas's; E. R. Sinton, Birmingham; W. P. Stamm, Guy's; Joan W. Stelfox, Liverpool; S. K. K. Sze, Camb. and St. Thomas's; G. H. Taylor, Guy's; Enid A. Taylour, Bristol; G. L. Timms, St. Thomas's; J. B. L. Tombleson, St. Thomas's; O. S. Tubbs, Camb. and St. Bart.'s; Patricia I. Unsworth, Liverpool; C. H. T. Wade, M.B. Manch.; H. C. Wadge, Oxford and St. George's; C. J. Watson, Camb. and St. George's; R. A. Wesson, Univ. College; E. W. Wilkins, Birmingham; E. J. Williams, Oxford and London; W. Wilson, Camb. and St. Bart.'s; H. W. Wykes, Middlesex.

### Royal College of Physicians of London.

The College will be closed from August 17th till Sept. 19th, both days inclusive.

### British College of Obstetricians and Gynæcologists.

The quarterly meeting of the Council was held in London on July 27th, with Prof. W. Blair Bell, the President, in the chair. Prof. J. M. Munro Kerr (Glasgow) and Dr. J. S. Fairbairn (London) were re-elected vice-presidents for the current year. A vacancy for a representative of the Members on the Council, occasioned by the elevation to the Fellowship of Prof. E. Farquhar Murray, was filled by the election of Mr. J. St. George Wilson (Liverpool) for the remainder of the current year.

Dr. T. M. Healy (Dublin) and Dr. Margaret I. Balfour (India) were admitted to the Fellowship *in absentia*.

It was reported that the finance and executive committee had inspected several premises but had so far not found a house in London that conformed to the requirements of the College. It was decided that the annual dinner should be held at Grosvenor House, Park Lane, London, on Oct. 23rd, and that this should be preceded by a ceremony for the conferment of the honorary Fellowship on Lord Riddell, Prof. Paul Bar (Paris), Prof. Whitridge Williams (Baltimore, U.S.A.), and Prof. Essen-Möller (Lund, Sweden), and also of ordinary Fellowships and Memberships.

### A Hospital Rate.

The town council of Gillingham, Kent, has decided to levy a rate towards the support of two of the local hospitals. The rate is expected to produce £585, of which £390 is to be allocated to St. Bartholomew's Hospital, Rochester, and £195 to the Kent County Ophthalmic and Aural Hospital at Maidstone.

## Medical Diary

*Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.*

### LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE ASSOCIATION, 1, Wimpole-street, W.

MONDAY, August 17th, to SATURDAY, August 22nd.—ALL SAINTS' HOSPITAL, Vauxhall Bridge-road, S.W. Special post-graduate course in Urology. Afternoons and some evenings. Demonstrations and cystoscopies. —QUEEN'S HOSPITAL FOR CHILDREN, Hackney-road, E. All day course. Medical and surgical demonstrations. Two weeks.—Further particulars from the Fellowship of Medicine.

ST. MARK'S HOSPITAL, City-road, E.C.

THURSDAY, August 20th.—4.30 P.M., Mr. E. T. C. Milligan: Modern Surgery of the Colon.

## Appointments

ACKERMAN, W. L., M.D., M.R.C.P. Lond., has been appointed Resident Medical Officer of Brighton Infirmary and Warren Farms Schools.

DRUM, E. F., M.B., Ch.B. N.U.I., Asst. Superintendent, Peamount Sanatorium, Dublin.

GEBBIE, N., M.D., Ch.B. Glas., D.P.H., M.O.H., Hull.

MAIN, F. F., M.B., Ch.B. Edin., Asst. M.O.H., Burgh of Kilmarnock.

London County Council: ROSE, D. F. (Miss), M.A., M.B., Ch.B. Edin., D.P.H., Temp. Asst. M.O., Hackney Hospital; LINDFORD, H. (Miss), M.D., Ch.B., Temp. Asst. M.O., Mile End Hospital; MORGAN, J. (Miss), M.B., B.S. Lond., Temp. Asst. M.O., St. Andrew's Hospital; SANDOW, J. F., L.R.C.P. Lond., M.R.C.S., Temp. Asst. M.O., St. James's Hospital; CHAMINGS, R. W. E., M.B., B.S., Temp. Asst. M.O., St. Giles's Hospital; HICKS, J. A. B., M.D., M.R.C.P. Lond., M.R.C.S., Pathologist, Lambeth Hospital Group Laboratory; BARNARD, W. G., M.R.C.P. Lond., M.R.C.S., Histologist, Southern Group Laboratory; ALLOTT, G. N., M.R.C.P., Pathologist, Lewisham Hospital Group Laboratory; GOODHART, G. W., M.D., B.Ch. Camb., Pathologist, Archway Hospital Group Laboratory; and EVANS, Sir THOMAS G. CAREY, M.D. Brux., F.R.C.S. Eng., L.R.C.P. Lond., Medical Superintendent, Hammersmith Hospital.

## Births, Marriages, and Deaths

### BIRTHS.

JACK.—On August 3rd, at Tunbridge Wells, the wife of Lt.-Col. Jack, I.M.S., of a daughter.

SIMMONS.—On July 31st, 1931, to John and Margery Simmons, M.B., B.S., B.Sc. (nee Freeborough), of New Chilterns, Amersham Common, Bucks.—a daughter.

STOTT.—On August 3rd, the wife of Dr. W. B. Stott, of Parkleigh, Park Drive, Grimsby, of a daughter.

### MARRIAGES.

HIGHMOOR—CAIRNS.—On August 5th, at St. Mary's Church, Ellon, Richard Anthony Highmoor, F.R.C.S.E., Bramerton, Norwich, to Margaret Combat, youngest daughter of Provost and Mrs. Cairns, Hassendean, Ellon, Aberdeenshire.

MACCORMAC—BROOMHALL.—On August 5th, at the Parish Church of Bishops Lavington, Henry MacCormac, M.D., F.R.C.P., to Marion Maud, eldest daughter of Dr. and Mrs. Broomhall, of Tai Yuan Fu, China.

### DEATHS.

ANDREWS.—On August 6th, at Beckmeadow, Mundesley, Norfolk, Lieut.-Col. L. A. A. Andrews (Dombey), late R.A.M.C.

CONNOLLY.—On August 5th, at Kingsdown, Ireland, Colonel E. P. Connolly, late R.A.M.S., aged 54 years.

LORD.—On August 9th, at Horton House, Epsom, Lieut.-Colonel John Robert Lord, C.B.E., M.D., F.R.C.P.E., Medical Superintendent, Horton Mental Hospital (L.C.C.).

*N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages and Deaths.*

# NOTES, COMMENTS, AND ABSTRACTS

## OSTEO-ARTHRITIS.*

By PHILIP FIGDOR, M.B. GLASG.,
PHYSICIAN TO ST. JOHN'S HOSPITAL, LEWISHAM; ASSISTANT PHYSICIAN TO THE LONDON TEMPERANCE HOSPITAL.

A GOOD deal of confusion still surrounds the subject of osteo-arthritis. This is partly because most of the work that has been done has been directed towards finding a specific remedy, while the disease itself has not yet been adequately studied and described. Different writers attach different meanings to the term osteo-arthritis, and the result is extremely confusing to anyone who consults their text-books.

In 1913 Sir Thomas Horder [1] suggested the classification of chronic arthritis into two main groups:—

1. *Osteo-arthritis*, mostly single joint affections affecting elderly people, with early bony changes.
2. *Rheumatoid arthritis*, mostly a polyarticular disease affecting younger people and with inconspicuous bony changes.

I find myself in agreement in principle with this classification, except that I would divide my two groups into (1) osteo-arthritis or mono-arthritis, and (2) polyarthritis.

The term polyarthritis is becoming increasingly popular with European writers. There are several distinct forms of polyarthritis, and some of them are definitely not what is understood by rheumatoid arthritis. In fact, rheumatoid arthritis is a term which is not used so much as formerly, and should be discarded.

### Radiological Appearances.

Our present state of knowledge of osteo-arthritis owes a great deal to radiology, which enables us to differentiate it from other forms of chronic arthritis. A clinical diagnosis of osteo-arthritis can always be either confirmed or excluded by X rays.

I regard Thomson's [2] description of the X ray appearances as a standard. He states that cyst-like structures are seen in all radiograms of osteo-arthritis, and tend to be massed together in localised areas of bone, forming what he calls "storm centres of disease." He claims that acute clinical symptoms (presumably pain) can always be shown to be associated with activity of one or more cyst-like formations on the joint surface. He goes further and states that, in joints without acute clinical symptoms, active cyst-like foci are not seen on the joint surfaces.

Clinical experience shows that there is some basis for this statement. Every now and again one comes across a case where it is accidentally discovered that the patient has definite, even advanced, osteo-arthritis and denies that he ever felt a twinge of pain or stiffness.

A brawny navvy of 50 injured his left knee while digging in the street. On the following day he had an acute synovitis and was sent to hospital for X ray examination to discover if there was any fracture. There was no fracture, but the radiologist reported an advanced degree of osteo-arthritis of the knee-joint. When I saw him, a few days later, I put it to him that he must have had pain in the joint before his accident. This he strenuously denied, pointing out that he had been a labourer, chiefly on road work, all his life. He had pain and limitation of movement of the knee-joint, of course, while he had synovitis, but after a few weeks his synovitis cleared up. Although he had coarse grating in the joint, he had full and free active movement of the joint and said he had no pain. He then returned to his work and, although he promised to return to see me if he had any pain or stiffness in the knee, he has not done so. Presumably he has remained well, although it is now four years since he attended hospital.

A somewhat similar case is that of a man, aged 62, a ship's rigger, who wrenched his left elbow while at work. A radiogram taken on the following day showed advanced osteo-arthritis of the elbow-joint. Here again the man denied previous pain or incapacity, pointing to the fact that his elbow had to function perfectly as he has to do a lot of climbing at his work.

Thomson [2] visualises two distinct and separate radiographic stages: (1) A primary stage, either cystic or granulomatous in type. This leads to erosion of joint cartilage. (2) A secondary stage of villous and osteophytic changes, which may result from such a mechanical erosion. He emphasises the fact that he considers the cyst-like formation to be the important radiographic sign, and almost pathognomonic. The osteophytic out-growths he believes not to be an essential part of the disease, but a product of the patient's reaction, an effort of nature to give extra support to or to limit the functions of diseased joints. It is not, radiographically, diagnostic of the disease.

R. L. J. Llewellyn [3] also recognises two stages in the life-history of osteo-arthritis—namely, a primary or pre-osteophytic phase of prolonged duration, the symptoms being those of villous hypertrophy, and a secondary or terminal stage in which bony and cartilaginous outgrowths appear. His view is that osteo-arthritis is a generalised and not a localised disorder. He thinks that it can be prevented from developing in the early stages, and says that osteophytes are shown in one knee and not in its fellow.

This is a point to which I would draw attention. I quite agree that one frequently comes across cases where the X rays show osteophytes in one knee only in the early stages. But my interpretation of this differs from Llewellyn's in that I hold that the appearance or development of osteo-arthritis in the second knee is a traumatic result of increased strain thrown on that knee when the other is more or less out of action.

### Ætiology.

Consideration of this subject almost always begins with the words "septic focus," and attempts to find an organism and to supply a vaccine. In the last two decades research has generally been in that direction. As it is only in the last few years that the radiologists have enabled us to label the disease with accuracy, it seems to me that there is still a great deal to be done in the way of bed-side investigation, as distinct from the laboratory. I have investigated 480 cases of osteo-arthritis, all of which have been confirmed by radiographic diagnosis. The accompanying table shows

*Cases of Osteo-arthritis.*

| Age. | Male. | Female. | Total. |
|---|---|---|---|
| 20–29 | — | 10 | 10 |
| 30–39 | 10 | 37 | 47 |
| 40–49 | 58 | 75 | 133 |
| 50–59 | 58 | 56 | 114 |
| 60–69 | 72 | 70 | 142 |
| 70–79 | 18 | 14 | 32 |
| 80 and over | 2 | — | 2 |
| | 218 | 262 | 480 |

that osteo-arthritis is a disease of middle and advancing age and that females are more affected than males: this is partly, but not wholly, explained by the fact that females live longer. It will be noted from the table that I have not come across a case of osteo-arthritis in a man below the age of 30, while I have had ten cases in women between 20 and 30, some of them in the early 'twenties.

I believe that osteo-arthritis is traumatic in origin, or rather, that the exciting cause is a trauma. In my cases 267 out of 480 gave a definite history of an injury, sometimes several years before the onset of osteo-arthritis. But, in stating that osteo-arthritis is traumatic in origin, I bring in stress and strain as evidence of trauma, as well as injury. Many cases with no direct history of injury or accident come into this category.

A man of 58 came to hospital with pain in the left shoulder, going down to the fingers, of three months' duration. X ray showed a moderate degree of osteo-arthritis of the shoulder-joint. He had never had an injury, but on inquiry I found that he had been an engineer but, owing to inability to get work at his trade, he had for the last three years been a

* Abridged from a lecture to the Fellowship of Medicine.

telephone labourer, which meant carrying a 30-lb. bag of tools on his left shoulder.

A man, over military age, drove a general in France during the war for eleven months. The car was a powerful one and had a very stiff clutch. He said that he used to have pain in his back at the end of a day's driving. When he gave up driving the car the pain left him. However, several years later when I saw him, he had severe pain in his back and an X ray showed advanced osteo-arthritis of his left sacro-iliac joint.

A man who had been an all-round athlete took up fencing when he reached the middle 'forties. He entered into it with such zest that he became a champion. I saw him when he was 62, and he had not been able to fence for some years because he had osteo-arthritis in both hip-joints, more on the right than on the left. The pathological factor in this case is that a strain was put on joints in middle age to which they were not accustomed. It is fairly safe to say that, had he been a fencer from his youth upwards, he would not have developed osteo-arthritis of his hip-joints.

Osteo-arthritis usually attacks only one joint (excluding the vertebræ). If two or more are affected, close investigation will establish that symptoms began in one an appreciable time before the second, and X rays will confirm this. The cause of the second joint being involved is traumatic—e.g., an osteo-arthritis in one hip-joint will cause the patient to put an increased load or strain on the other hip-joint and will, in untreated cases, cause osteo-arthritis there.

In my series there are 12 cases where both hip- and knee-joints were affected: in six the hip-joint was affected first and in the other six the knee-joint. It is noteworthy that osteo-arthritis occurs in the women who have a rapid and heavy increase in body-weight before or at the time of the menopause. In my series of 100 cases of osteo-arthritis of the knee-joints in women only 28 gave a history of injury.

The type of direct injury that causes osteo-arthritis is more obvious. A young man dislocates his shoulder. The dislocation is reduced and he has no further trouble. A middle-aged or elderly man has his dislocation reduced and in a variable number of months or a year or two he develops an osteo-arthritis of the shoulder-joint. A similar result frequently follows a fracture of the upper end of the humerus. A workman has a fall, or is struck on the back. He is taken to hospital and is X rayed, with negative results as regards fracture. In many of these cases osteo-arthritis of the spine develops later.

It is trauma in the middle-aged and elderly that produces osteo-arthritis. Similar traumata in the young do not.

In my series of lumbar and sacro-iliac osteo-arthritis in women, 36 out of 46 had no history of injury, but 26 had had gynæcological operations and two had had hæmorrhoid operations. Eight of these 28 had had pain in the back before the operation, but the others had not, and in all the other 20 pain in the back came on within a few months of operation, and the X ray showed sacro-iliac osteo-arthritis. I incline to the view that this was due to injury to the sacro-iliac joints at the time of operation, in placing the patient into position for operation, or in letting the legs down afterwards.

### "Malignant Arthritis."

Osteo-arthritis, like cancer, attacks the middle-aged and elderly—i.e., the physiologically dying. Trauma in this state produces a pathological change. What is this change? Thomson and other radiologists are emphatic that the process is degenerative and not malignant. But though the radiologists may be emphatic, their task is not always easy.

A few months ago I saw a woman, aged 51, who was clinically a well-established case of osteo-arthritis of the right shoulder-joint. I sent her for a X ray examination to confirm the diagnosis. The radiologist's report was as follows: "The bone of the upper third of shaft and head of the humerus and of scapula in region of shoulder-joint shows areas of rarefaction. ? Cystic degeneration. Is there any question of secondary deposits in this case?"

In this case there was no question of any pre-existing malignant disease and yet that was the radiologist's report. Every now and again one gets these reports, particularly from young and inexperienced radiologists.

That the disease does not kill is no criterion. It causes such severe pain and is often so resistant to any treatment that one is almost justified in labelling it "malignant arthritis."

To those who still think in terms of oral sepsis, it can be pointed out that the disease attacks people who have reached the age of double dentures, and, in those who have teeth, extraction of the remaining teeth seems to make very little difference. As a matter of fact, osteo-arthritis seems to attack mainly people who have led healthy, active, temperate, and even abstemious lives. The intemperate form a very small proportion of these cases. These people deserve a good deal more sympathy than they receive. The pain of osteo-arthritis is one of the most severe that any disease produces, yet the victims, because, as they say, "they have nothing to show for it," are enjoined by their friends (and often by their doctors) to exercise the joints or they will get stiff and have more pain. Of course, the more they exercise the worse the pain.

### Diagnosis of Osteo-arthritis.

It is, of course, very important to diagnose the condition as early as possible, for the prognosis depends very largely on that. Now, particularly in the case of the shoulder- and hip-joints, the first symptom is generally a pain, not located at or near the joint itself but in the muscles below the joint—i.e., a referred pain. A good proportion of these cases come to the hospital with a diagnosis of "neuritis."

In my series 128 out of 145 cases of osteo-arthritis in the shoulder-joint had referred pain down the arm, mostly pain from the shoulder to the elbow; and in the hip-joint 54 out of 64 had pain down the thigh, sometimes to the knee, and a few had pain in the knee-joint only. This referred pain is not only an early symptom, but it is the main symptom throughout the history of the case until, in fact, the disease is arrested. In the knee-joint pain is generally confined to the knee. Only a small minority complain of pain radiating down the shins. In sacro-iliac and lumbar osteo-arthritis, the pain is generally confined to the lower back, but some cases reach hospital diagnosed as sciatica.

Limitation of movement of the joint is usually early. In the hip-joint and shoulder-joint abduction is the chief restriction. As the disease progresses, there is a functional ankylosis. I have come across an occasional bony ankylosis in the hip-joint, but most authorities deny that this ever happens.

Grating occurs in the knee-joints, but is not diagnostic, because it also occurs commonly in healthy joints. The same remark can apply to the early stages in the shoulder-joint. The knee-joint, however, does become definitely enlarged, particularly—judging by its appearance—the lower end of the femur, giving the knee a characteristic look.

The gait of a person with osteo-arthritis of the hip-joint is a characteristic waddling, with almost nothing to distinguish it from that of a case of congenital double dislocation of the hip-joint. Muscular wasting occurs, but it is seldom a gross wasting and sometimes is not very apparent.

#### A PATHOGNOMONIC SIGN.

In observations previously published,[4] I have noted what I believe to be a pathognomonic sign of osteo-arthritis in the lumbo-sacral region, including, of course, the sacro-iliac joints. When the patient lies on his face and the lumbo-sacrum is palpated with the flat of the fingers, there is a characteristic flabby, "penetrating" feel of the wasted lumbar and sacral muscles, giving one almost the impression that one is palpating the bare bone. There is no tenderness on palpation. It is difficult to describe the tactile sensation one receives, but I believe it to be pathognomonic. Of the 86 cases in my series every one had this sign.

### Treatment.

I have elsewhere [5] defined a specific therapeutic agent as "one which, used in a particular, definite, and

specified form—e.g., in a drug of a definite chemical composition—and applied in a particular, definite, and specified way to a particular, definite, and specified disease or pathological condition, secures a relief from symptoms and a return to normal and active function of the body or part, excluding permanent tissue damage." According to that definition, there is no specific remedy for osteo-arthritis.

Claims have been made that particular micro-organisms are the cause of osteo-arthritis, but Koch's postulates have not been fulfilled.

Warren Crowe [6] believes in the view, advanced by many workers in the last two decades or so, that streptococci are the cause of osteo-arthritis and non-articular rheumatism. He stresses the numerous varieties of streptococci and the difficulty in differentiating them. In treatment, therefore, in order to make certain that the several streptococci infecting any given patient are included, he advocates the use of a stock streptococcus vaccine, containing the greatest possible number of different streptococci.

My own view, and one that I take care to emphasise to patients, is that the most important part of treatment is rest. The affected joint must be rested. Future restoration of function of the joint is, in my belief, a secondary consideration to getting rid of the pain. The first object of treatment must be to ease the patient of the sometimes intolerable pain he suffers. I am against any forcible movement of the joint, as it sometimes lights up the disease again. Some cases where the pain has entirely ceased but where there is almost an ankylosis of the joint, in the course of a year or two (sometimes a few months), with freedom from pain, achieve an almost complete restoration of function of the joint by the patient's own natural efforts.

In osteo-arthritis of the shoulder-joint, the arm should be placed in a complete sling, with the elbow well supported, so that all weight is taken off the shoulder-joint. It is surprising what relief this simple procedure often gives. It is not easy to achieve rest of the hip- or knee-joints while the patient is going about. In some cases a walking calliper is the only thing that will ease the pain.

I believe that osteo-arthritis is a local and not a general condition, and that local treatment in the form of rest is essential. The application of liniments and pastes to the seat of pain or to the joint is useless. Massage, also, is not only useless but is contra-indicated, as it often increases the pain.

Diathermy is the most valuable form of treatment. The current should be directed to and concentrated on the affected joint and nowhere else, and should be given three times a week for 15 to 20 minutes. Where the patient reacts to this treatment, sometimes as few as half a dozen treatments will give relief from pain of some months' duration, but generally the duration of treatment should be reckoned as many weeks up to several months. I believe that diathermy is the nearest approach we have to a specific remedy for osteo-arthritis. The patient generally finds the treatment very soothing, and it frequently banishes the pain for the time being, even in the early days. Precisely how it acts one cannot determine. Certainly in the majority of cases it seems to arrest the disease process, whatever that may be. The large majority of my cases have done very well with diathermy and require no other form of local treatment.

Every now and again one comes across cases that do not respond to diathermy, but do well with radiant heat or chlorine ionisation, provided that the patient has had a course of diathermy first.

There is one form of general treatment which must be given in all cases, and that is an analgesic or a sedative of some kind until the local treatment has had time to take effect. I generally advise grs. 10 or grs. 15 bromide mixture thrice daily. If the pain disturbs the patient's rest I do not hesitate to give a soporific nightly for several weeks if necessary. The most important point of all is the necessity for as complete rest to the joint as it is possible to obtain.

REFERENCES.

1. Horder, T. H.: Clin. Jour., 1913, iii., 325.
2. Thomson, J. A.: Proc. Roy. Soc. Med., 1929, p. 1119.
3. Llewellyn, R. L. J.: Proc. Bath Conference, 1928, p. 120, et seq.
4. Figdor, P.: Clin. Jour., 1929, lviii., 152.
5. Same author: Med. World, 1925, xxiii., 44.
6. Crowe, H. W.: Bacteriology and Surgery of Chronic Arthritis and Rheumatism, London, 1927.

## THE TREATMENT OF FRACTURES.

A CONCISE and valuable account of the treatment of fractures and its underlying principles has been prepared by the Fracture Committee of the American College of Surgeons [1] and published in the quarterly *Bulletin* of the College (1931, xv., No. 1). In 30 pages, copiously illustrated, a description is given of the normal processes of bone repair, the conditions favouring them, the functions of practitioner and surgeon in promoting them, and the management of many particular varieties of fracture. No attempt has been made to describe operative procedure, the technique of skeletal traction, or methods of local anæsthesia, and the summary is written with an eye to the requirements of general rather than hospital practice. Emphasis is laid especially on the importance of the "emergency initial treatment," the dangers of delay, and the importance of functional restoration. "The treatment of difficult fractures requires the care of experienced surgeons."

The outline concludes with the following series of aphorisms:—

APHORISMS.

Always use gentleness and care in handling any broken limb. Roughness is inexcusable.

Use only the simplest methods of examination for the diagnosis of fracture.

Eliminate all unnecessary handling of the injured limb.

Definite localised tenderness over an injured bone usually is satisfactory evidence of fracture.

Never attempt to elicit crepitus.

Disturb the patient and the injured part as little as possible.

Do not be deceived by the absence of deformity and disability; in many cases of fracture some ability to use the limb persists. Sufficient examination is one which includes a short history, a brief inspection and palpation limited to the localisation of the point of greatest tenderness, coupled with a slight test for false motion.

Do not overlook the responsibility of making a diagnosis. Look for more than one fracture.

An exact diagnosis is absolutely essential to proper treatment and requires suitable X ray films taken in two planes.

Make it a duty to see that the patient has an early suitable X ray examination and competent treatment thereafter.

Keep the axes of the ankle- and knee-joints absolutely transverse. When the sole of the foot rests flat on the ground, the top surface of the astragalus should be parallel with the ground.

A stiff shoulder following a fracture of the forearm usually may be prevented. The functional utility of the limb as a whole is a good measure of successful treatment.

Following fracture, the damage of the injury per se must always be reckoned with and deducted from the normal attainable by treatment.

Passive movements affect bone and joint surfaces, often injuring them both. Active movements affect muscles and mind, usually strengthening both. Guided muscular contractions are of primary importance in causing bony union provided, of course, motion of the bone fragments is avoided. Doctors and the public have been taught for ages to keep broken limbs at absolute rest for many weeks.

Apply traction in such a way as to tire the muscles and not produce irritation; that is, make the pull slow, steady, and if necessary increase its force, until

[1] 40, East Erie-street, Chicago, Illinois.

the contraction of the muscles attached to the fragments is overcome.

Bring the fragment which can be controlled into alignment with the fragment which cannot be controlled.

The circulation distal to the fixation apparatus should be observed frequently during the first three days until all possible danger of increased swelling under snug splinting has passed.

A small insignificant fracture may mean a large disability. Reduce the fracture with as little delay as possible. It is poor practice to wait for the swelling to go down. A primary reduction will give a better result than a secondary reduction.

Examine for nerve lesions and for associated injuries before attempting reduction.

Make an exact diagnosis of the fracture first and then, if necessary, select a splint. A splint may not be needed. Splints are often harmful. No splint is used to reduce a fracture; a splint is intended to maintain reduction. Splints made to fit everybody rarely fit anybody. Make it a practice to splint effectively. When wooden splints are employed use a large amount of padding on the splint.

Treat every case of injury as a fracture until it is proven otherwise. Limit manipulation without an anæsthetic to the correction of the most obvious deformities only, for a broken bone is exceedingly painful and any motion accentuates the pain. Secure the best alignment possible, for the better the alignment obtained in reduction, especially better will be the resulting function.

Mechanical arthritis may result from static faults after partial reductions, in fractures of the lower extremity.

Voluntary active movement of joints contiguous to the fracture as early as possible without disturbing the fracture is highly desirable. Early active movement will prevent the formation of peri-articular adhesions and adhesions within joints.

In the transportation of the patient, do not underrate the importance of temporary immobilisation to relieve pain and muscle spasm and to promote clotting of blood at the bone ends. Continued pain after 24 hours is usually indicative of an incomplete reduction of the fracture or of improperly applied splints.

## C.S.M.M.G. REGISTER.

THE register of members of the Chartered Society of Massage and Medical Gymnastics from July, 1920, to May, 1931, contains, besides the list of members of both sexes in the British Isles, information concerning registration, the objects of the society, and the Ling Association. In this issue of the register mention is made of the additional professional qualifications of members of the society, such as nursing, midwifery, educational gymnastics, or dispensing. A new sign indicates whether the member is on the roll of biophysical assistants, established in 1929 by the Society of Apothecaries. Chartered masseuses and masseurs who have qualified through their own society in light and electrotherapy are eligible for admission to this roll without other formality than the payment of the primary registration fee. At the end of the book an index of members, arranged under postal districts, is included; this should be convenient for the use of medical men in need of a masseuse living locally. The register may be obtained from the offices of the society at Tavistock House (North), Tavistock-square, London, W.C., for 4s.

# Vacancies

*For further information refer to the Advertisement columns.*

*Accrington, Victoria Hospital.*—H.S. £150.
*Barnstaple, North Devon Infirmary.*—Res. M.O. At rate of £150.
*Bedford County Hospital.*—Asst. H.S. At rate of £130.
*Birmingham and Midland Eye Hospital, Church-street.*—H.S. £110.
*Birmingham, Canwell Hall Babies' Hospital.*—Second Res. M.O. At rate of £200.
*Birmingham General Hospital.*—Anæsthetist. £120. H.P. £70.
*Birmingham, Queen's Hospital.*—Third Physician to Out-Patients. £50.
*Bolton County Borough.*—M.O.H. £1200. Also Deputy M.O.H., &c. £750.
*Bradford, Children's Hospital.*—H P £120.
*Bristol, City and County of.*—Asst. M.O.H. £500.
*British Medical Association.*—Scottish Medical Secretary. £950.
*Cardiff, King Edward VII. Welsh National Memorial Assn.*—4 Asst. Tuber. O's. Each £250
*Carlisle, Cumberland Infirmary.*—H.P., Second H.S. Also H.S. to Special Depts. Each at rate of £155.
*Derby, Derbyshire Royal Infirmary.*—Ophth. H.S. £150.
*Doncaster Royal Infirmary.*—H.P. At rate of £175.
*Dudley, Guest Hospital.*—Asst. H.S. £170.
*Durham C. C.*—Asst. Welfare M.O. £500.
*Edinburgh Royal Hospital for Mental and Nervous Disorders.*—Asst. P. £350.
*Evelina Hospital for Children, Southwark, S.E.*—Anæsthetist 25 guineas. Also H.S. At rate of £120
*Glasgow Eye Infirmary.*—Res. Asst. H.S. £150.
*Gloucestershire Royal Infirmary and Eye Institution.*—H.P. At rate of £150.
*Golden Square, Throat, Nose and Ear Hospital, W.*—Hon. Asst. Surg. Also H.S. £100.
*Great Yarmouth General Hospital.*—H.S. £140.
*Guildford, Royal Surrey County Hospital.*—Res. Med. and Surg. O. and Reg. £250.
*Harrogate Infirmary.*—H.P. £150. Also Jun. H.S. £125.
*Hove, Lady Chichester Hospital.*—Jun. H.P. At rate of £50.
*Huddersfield Royal Infirmary.*—H.S. At rate of £150.
*Hull Royal Infirmary.*—Third H.S. for Parent Institution £150. Also H.P. Sutton Branch Hospital. £160.
***Ipswich, East Suffolk and Ipswich Hospital.***—4 H.S.'s and 1 H.P. Each £120.
*Islington Dispensary, 303, Upper-street, N.*—Asst. Res. M.O. £250.
*Kidderminster and District General Hospital.*—H.S. £150.
*Leicester Royal Infirmary.*—H.P. and H.S.'s. Also Cas. H.S. All £125.
*Liverpool Heart Hospital.*—Hon. Asst. Phys.
*Liverpool, Royal Children's Hospital, Myrtle-street.*—Res. Cas. O. £250.
*Liverpool, Walton Hospital, Rice-lane.*—Res. Asst. M.O.'s. £200.
*London Temperance Hospital, Hampstead-road, N.W.*—H.P. At rate of £100.
*Longton Hospital, Staffs.*—H.S. £150.
*Maidstone, Kent County Ophthalmic and Aural Hospital.*—H.S. £200.
*Manchester, Ancoats Hospital.*—Res. M.O. At rate of £150.
*Manchester Royal Eye Hospital.*—Jun. H.S. £120.
*Margate and District General Hospital.*—Res. M.O. £125.
*Margate Royal Sea Bathing Hospital for Surgical Tuberculosis.*—H.S. At rate of £200.
*Mildmay Mission Hospital, Austin-street, Bethnal Green, E.*—Jun. Res. M.O. At rate of £100.
*Newcastle General Hospital, Newcastle-upon-Tyne.*—Three H.S.'s. Each at rate of £150.
*Newcastle-upon-Tyne, Education Committee.*—Asst. School M.O. £650.
*Newcastle-upon-Tyne, Hospital for Sick Children.*—H.P. and Sen. and Jun. H.S.'s. All at rate of £100.
*Newcastle-upon-Tyne, Royal Victoria Infirmary.*—Jun. Surg. Reg. £150.
*Nottingham Children's Hospital.*—Res. H.S. At rate of £150.
*Poplar, Metropolitan Borough of.*—Asst. Tub. Officer, &c. £550.
*Portsmouth, Royal Hospital.*—Sen. H.S. £175. H.P. and Two H.S.'s. Each £130. Also Cas. O. £100.
*Preston and County of Lancaster, Royal Infirmary.*—Res. Surg. Officer. £300.
*Queen Charlotte's Maternity Hospital, Marylebone-road, N.W.*—Asst. Res. M.O. At rate of £80.
*Queen's Hospital for Children, Hackney-road, E.*—Cas. O. At rate of £100.
*Rotherham Hospital.*—Cas. H.S. £150.
*Royal College of Physicians, Pall Mall East.*—Milroy Lecturer.
*St. Leonards-on-Sea, Buchanan Hospital.*—Jun. H.S. £125.
*Scunthorpe and District, War Memorial Hospital.*—1st H.S. £150.
*Sheffield Royal Hospital.*—Ophth. H.S. Also Anæsthetist. £120 and £80 respectively.
*Sheffield Royal Infirmary.*—Asst. Aural and Ophth. H.S. and H.S. and Second Asst. Cas. O. Each at rate of £80.
*Southampton County Borough, Isolation Hospital.*—Res. M.O. £350.
*Southampton Free Eye Hospital.*—H.S. £150.
*Stamford, Rutland and General Infirmary.*—H.S. £4 4s. weekly.
*Stockport Infirmary.*—H.P. £175.
*Swansea General and Eye Hospital.*—H.P. £150.
*Swansea, Swansea and Merthyr, Tydfil, Joint Mental Hospital.*—Med. Supt. £800.
*Tilbury Hospital, Essex.*—H.S. At rate of £150.
*Wakefield, Clayton Hospital.*—H.S. At rate of £200.
*Walsall General Hospital.*—H.P. and H.S. Each at rate of £150.
*Weir Hospital, Grove-road, Balham, S.W.*—Res. M.O. for War Maternity Home. £150.
*West London Hospital, Hammersmith-road, W.*—Res. Asst. S. £200.
*Westminster Hospital, Broad Sanctuary, S.W.*—H.S. to Ear, Nose and Throat Dept. At rate of £102.
*Weston-super-Mare General Hospital.*—Res. H.S. £150.
*Wolverhampton and Midland Counties Eye Infirmary.*—H.S. £150.
*Woolwich and District War Memorial Hospital, Shooters Hill, S.E.*—H.S. At rate of £100.

The Chief Inspector of Factories announces the following vacant appointments for Certifying Factory Surgeons at Ripley (Yorks.); Pateley Bridge (Yorks.); Stockport (Ches.); Kirkham (Lancs.).

# Special Supplement.

# THE LANCET COMMISSION ON NURSING

## SECOND INTERIM REPORT

THE LANCET Commission on Nursing was appointed in December, 1930, to inquire into the reasons for the shortage of candidates, trained and untrained, for nursing the sick in general and special hospitals throughout the country, and to offer suggestions for making the service more attractive to women suitable for this necessary work.

The members of the Commission are :—

The Earl of CRAWFORD and BALCARRES, P.C., K.T., F.R.S. (Chairman).

Prof. HENRY CLAY, M.A., D.Sc., late Professor of Social Economics in the University of Manchester.

Miss R. E. DARBYSHIRE, R.R.C., Matron, University College Hospital.

Miss L. CLARK, M.B.E., R.R.C., Matron, Whipps Cross Hospital.

Dr. ROBERT HUTCHISON, F.R.C.P., Physician to the London Hospital and to the Hospital for Sick Children, Great Ormond-street.

Prof. F. R. FRASER, M.D., F.R.C.P., Professor of Medicine in the University of London, Physician to St. Bartholomew's Hospital.

Mr. A. LISTER HARRISON, J.P., Chairman, Committee of Management, Metropolitan Hospital.

Miss M. D. BROCK, O.B.E., M.A., Litt.D., Headmistress, the Mary Datchelor Girls' School.

Mrs. OLIVER STRACHEY, Chairman, Employments Committee, London Society for Women's Service.

Miss EDITH THOMPSON, C.B.E., Member of Council, Bedford College, University of London.

Sir SQUIRE SPRIGGE, M.D., F.R.C.P., the Editor of THE LANCET, with Dr. M. H. KETTLE, an assistant editor, as honorary secretary.

In order to ascertain the degree and the nature of the shortage, and the conditions of training and service offered, the Commission decided to send a questionnaire to the responsible authorities of *all* hospitals approved as training centres by the General Nursing Councils of England and Wales, Scotland, and Ireland, and to a number of other hospitals not so approved. Altogether 1251 questionnaires were sent out, of which 1031 were addressed to hospitals in England and Wales, 118 to hospitals in Scotland, and 102 to hospitals in Ireland.

The first Interim Report of the Commission was published in THE LANCET of Feb. 28th, 1931, when the distribution of the questionnaire to various groups of hospitals was described. The principal feature of the First Interim Report, however, was a preliminary analysis, by Mr. A. Bradford Hill, D.Sc., of the returns received before Feb. 15th from hospitals in certain groups. That preliminary analysis is now rendered obsolete by Dr. Hill's Final Report on the material submitted to him, which is set out below. The Commission wish to record their gratitude to Dr. Hill for the arduous task he has accomplished with so much skill, and to Prof. Major Greenwood for kindly agreeing that the work should be done in the Department of Epidemiology and Vital Statistics of the London School of Hygiene and Tropical Medicine.

The Commission are now engaged in considering the statistical evidence in connexion with the evidence which has been put before them by various organisations and individuals.

In order to provide a convenient index for readers, the questionnaire issued is set out below, the relevant paragraphs and tables in Dr. Bradford Hill's final report being appended to each question.

QUESTIONNAIRE ISSUED BY THE LANCET COMMISSION ON NURSING, JANUARY, 1931.

1. What is your full establishment of A, Sisters ; B, Staff Nurses ; and C, Probationers ? (Para. 6 ; Table II.)
2. What number of A, B, and C have you working at the present time ? (Paras. 6, 7, 8, 19 ; Tables II., III., X.)
3. Have you a waiting list for vacancies (A, B, and C) ? (Para. 9 ; Table IV.)
4. If not, do your advertisements for A, B, and C usually bring sufficient replies from suitable candidates ? (Paras. 9, 10, 11, 12, 13, 14 ; Table IV.)
5. At what age do you admit probationers ? (Para. 15 ; Table VI.)
6. What are the educational requirements for acceptance of a probationer (seventh standard, secondary education, school-leaving certificate, matriculation, etc.) ? (Para. 16 ; Table VII.)
7. May we have a copy of : (*a*) The rules sent to prospective candidates if not identical with (*b*) ? (*b*) The rules handed to nurses ?
8. Is a separate bedroom provided for each probationer ? (Para. 17 ; Table VIII.)
9. Have you found it necessary to employ "temporary nurses" ? If so, how many are working in the hospital at the present time ? (Para. 14 ; Table V.)
10. How many domestic workers (orderlies, ward maids, or daily workers) are employed on ward duty only ? (Para. 18 ; Table IX.)
11. What is the average number of beds occupied per night over a year ? (Paras. 18, 19 ; Tables IX., X.)
12. Please state briefly below what you believe to be the reasons for any shortage of B (staff nurses) and C (probationers), and suggest measures which might relieve it. (Paras. 20, 70, 71, 72, 73, 74, 75, 76.)

13. May we have a copy of the training school prospectus?
14. How many probationers did you admit in: 1928, 1929, and 1930? (Para. 21; Tables XI., XIIA.)
15. How many candidates passed the final S.R.N. last year? (Para. 21; Tables XI., XIIA.)
16. Of the nurses who failed to complete their training in 1928, 1929, and 1930, how many left—during their first year, during their second year, and during their third year—as a result of: (*a*) ill-health; (*b*) marriage; (*c*) failure to pass examinations; (*d*) sickness at home; and (*e*) other causes? (Paras. 21, 22; Tables XII., XIIA.)
17. What is the length of the training course? (Para. 23; Table XIII.)
18. Do probationers have to undertake to work for the hospital for a year after completion of training? (Para. 24; Table XIII.)
19. How much (if any) fee or deposit has to be paid by probationers on starting training? (Para. 25; Table XIV.)
20. How much are probationers and trained staff paid: (*a*) first year; (*b*) second year; (*c*) third year; (*d*) staff nurses, if different from third year nurses; (*e*) sisters? (Paras. 26, 27, 28, 29, 30, 32; Tables XV., XVI., XVII., XVIII., XIX., XIXA.)
21. Are you affiliated to a superannuation scheme? If so, is membership compulsory? (Para. 33; Table XX.)
22. Is there a separate uniform and laundry allowance? And if so, how much? (*a*) Laundry allowance; (*b*) uniform allowance. (Para. 31.)
23. Are outdoor uniforms compulsory? If so, are they provided? (Para. 31.)
24. Have you any facilities for exercise and recreation? (Para. 34; Table XXI.)
25. Are common-rooms provided? (Para. 35; Table XXI.)
26. Are men guests admitted? (Para. 36; Table XXI.)
27. Is smoking permitted in any part of the nurses' home? (Para. 37; Table XXI.)
28. Have the senior nurses a latch-key? (Para. 39; Table XXII.)
29. What time must nurses be back without a late pass? (Para. 38; Table XXII.)
30. Is attendance at meals compulsory even when meal-times are adjacent to off-duty hours? (Para. 45; Table XXIV.)
31. What are the duty hours of nurses? By day; by night? (Paras. 46, 47, 52, 53, 54, 55; Tables XXV., XXVI., XXX.)
32. What are hours off for meals? Breakfast, early lunch, lunch, tea, supper. (Paras. 40, 41, 42, 43, 44, 45, 52; Tables XXIII., XXX.)
33. Off-duty times and holidays: (1) Daily; (2) fortnightly; (3) weekly; (4) yearly. (Paras. 48, 49, 50, 51, 52; Tables XXVII., XXVIII., XXIX., XXX.)
34. Notice in advance of off-duty times and holidays: Hours off; day off; annual holiday. (Paras. 56, 57, 58, 59; Tables XXXI., XXXII.)
35. Night duty: Stretch of night duty; nights per month off duty for night sister, staff nurse, probationer. Are night nurses relieved at night for meals? (Paras. 60, 61, 62; Tables XXXIII., XXXIV.)
36. Lectures: Time of day? In off duty? In duty time? (Paras. 63, 64; Table XXXV.)

# STATISTICAL ANALYSIS OF THE QUESTIONNAIRE

## ISSUED TO HOSPITALS BY "THE LANCET" COMMISSION ON NURSING.

## FINAL REPORT SUBMITTED TO THE COMMISSION.

By A. Bradford Hill, Ph.D., D.Sc.

### Introduction.

1. The first interim report, published in The Lancet of Feb. 28th, 1931, was confined to a statistical analysis of the replies received in answer to the first 12 questions of a long questionnaire which had been issued to 1251 hospitals by The Lancet Commission on Nursing. That preliminary analysis has now been extended to cover, in addition, the further 24 questions which were put at the same time to all approved Training Schools [1] among these 1251 hospitals. The earlier study was limited to a sample of the answers received from five groups of hospitals, viz.: Training Schools approved by the General Nursing Council for complete training,[2] as represented by London Voluntary, Provincial Voluntary, and London and Provincial Municipal Hospitals, and Hospitals not approved as training schools, which were subdivided into General and Special hospitals.

As well as extending the analysis to questions 13–36, the present report deals again with the answers to questions 1–12 received from five groups of hospitals dealt with in the first interim report, to which have been added further hospitals in the same categories. These are here set out, together with answers received from the seven other types of hospitals to which the questionnaire was also issued—namely, hospitals approved for partial training (Affiliated, Associated, Reciprocal),[2] hospitals approved as training schools for supplementary registers (Children, Fever, Mental), and Tuberculosis hospitals; this gives in all 12 groups (totalling 1031 hospitals), as shown in Table I., all these thousand hospitals (with the exception of certain tuberculosis hospitals) being situated in England and Wales. Questionnaires were also sent to 118 Scottish and 102 Irish hospitals within the same categories. The groups in these countries were in some cases exceedingly small (e.g., in Scotland there are only three, in Ireland only two children's hospitals approved as training

[1] Questions 18–36 were put also to tuberculosis hospitals and sanatoriums.

[2] *Complete training schools* are those which have satisfied the General Nursing Council that medical, surgical, gynæcological, and children's diseases services are provided. At least one resident medical officer must be kept, the period of training must be not less than three years, and the ratio of medical to surgical beds must not exceed 2 : 1, or be less than 1 : 2.

*Affiliated Hospitals* are not considered sufficiently large to give a complete training, but may be affiliated to a complete training school. Four years' training is here compulsory, two years being spent in the affiliated hospital, at the end of which the preliminary state examination is taken. Having passed this examination, the probationer goes to the larger hospital for two years.

*Associated Hospitals.*—(1) Hospitals deficient in one branch of training may, in order to supply that branch, associate themselves with another hospital which must have a resident medical officer. The combined period of training must extend over three and a half years. (2) A hospital for men only may associate itself in this way with a hospital for women only and one for children only, when the course may extend over four years.

*Reciprocal Hospitals.*—Reciprocity between special and general hospitals involves two years in an approved special hospital and two years in a general hospital. Training in the special hospital must include the subjects of the preliminary State examination.

schools), but it was thought necessary to consider the returns separately in case the replies revealed some notable difference in conditions of service, recruitment, &c., between the countries. No such notable difference appears to exist, though the numbers of questionnaires returned from Scotland and Ireland were too small to enable any reliable statistical study to be made (in some groups the proportion returned was as low as one-third of those sent out). The statistical study had therefore to be limited to the larger and more adequate sample collected from hospitals situated in England and Wales; the Scotch and Irish returns have been utilised as far as possible by the Commission to supplement other evidence submitted to them, but have not been tabulated.

2. In England and Wales there are 304 hospitals approved by the General Nursing Council for complete training; 127 for partial training; 22 children's hospitals, 72 fever hospitals, and 119 mental hospitals are approved training schools for supplementary parts of the register. To all these hospitals questionnaires were sent, and also to a sample of general and special non-approved hospitals, and to a sample of tuberculosis hospitals.

3. Table I. shows that out of 1031 questionnaires sent to hospitals in England and Wales, 686, or 67 per cent.—i.e., roughly two-thirds—were returned. The proportion returned varies from over four-fifths in the case of the London Voluntary hospitals, London and Provincial Municipal hospitals, and Children's hospitals to a little over one-half in the case of hospitals for Reciprocal training and Tuberculosis hospitals.

4. To what extent these samples are representative of the total groups from which they are drawn it is impossible to state. It might well be that hospitals experiencing no difficulty in securing their staff, and therefore, perhaps, with better conditions of service than the average, did not bother to reply. Alternatively it might be thought that hospitals with conditions appreciably worse than the average might hesitate to complete a rather searching questionnaire. Any such tendency would mean that the samples were not representative of all hospitals. Taking the hospitals as a whole, however, it may be fairly argued that the existence of such a tendency is not necessarily of great importance. If the better [3] hospitals tended not to reply, then the evidence of conditions of service here produced, though not representative, gives a picture of conditions in those hospitals in which improvement is most likely to be required, and to which the Commission's recommendations must most apply. If, on the other hand, the worse[3] hospitals tended not to answer, then, at least, it can be said that the need for improved conditions, if such need be found to exist, is here under-stated, and that the Commission's recommendations must apply with still greater force to those hospitals that did not return the questionnaire. It is, however, impossible to apply any such arguments to the comparison of the various groups of hospitals one with another. It has been pointed out that the proportion of questionnaires returned varies considerably between these groups. A group with a low proportion may be less representative than a group with a high proportion. For instance, replies were received from 89 per cent. of the London Voluntary hospitals, 86 per cent. of the Children's hospitals, and 84 per cent. of the London and Provincial Municipal hospitals. With such high proportions no very great bias can exist. On the other hand, where only just over one-half of the hospitals replied, as in Reciprocal hospitals, considerable bias might exist. Still more is this possible in the case of Tuberculosis hospitals, for the number questioned was not, as in the case of Reciprocal hospitals, the whole number existing.

[3] "Better" or "worse" are here used in the sense of offering better or worse conditions of service.

## TABLE I.

HOSPITALS IN ENGLAND AND WALES TO WHICH QUESTIONNAIRE WAS SENT.

| Type of hospital. | Number of hospitals to which questionnaire was sent. | Number of questionnaires returned and analysed. | Number analysed as percentage of total sent out. |
|---|---|---|---|
| Hospitals approved as Complete Training Schools*:— | | | |
| London Voluntary .. .. | 36 | 32 | 89 |
| Provincial Voluntary .. .. | 164 | 122 | 74 |
| London and Provincial Municipal.. | 104 | 87 | 84 |
| Hospitals approved for Partial Training*— | | | |
| Affiliated .. .. .. .. | 68 | 41 | 60 |
| Associated .. .. .. .. | 25 | 19 | 76 |
| Reciprocal .. .. .. .. | 34 | 19 | 56 |
| Hospitals approved for Special Training*— | | | |
| Children .. .. .. .. | 22 | 19 | 86 |
| Fever.. .. .. .. .. | 70‡ | 43 | 61 |
| Mental .. .. .. .. | 119 | 75 | 63 |
| Hospitals not approved as Training Schools†— | | | |
| General .. .. .. .. | 185‡ | 109 | 59 |
| Special .. .. .. .. | 87‡ | 56 | 64 |
| Tuberculosis .. .. .. | 117‡ | 64 | 55 |
| Total .. .. .. .. | 1031 | 686 | 67 |

* The complete questionnaire was sent to *all* these hospitals approved as training schools by the General Nursing Council of England and Wales, Scotland, and Ireland.

† These represent a sample of hospitals not approved as training schools selected (as described in the first interim report) so as to be representative of all such hospitals. Questions 1–12 only were sent to general, special, and tuberculosis hospitals. Tuberculosis hospitals also received Questions 18–36.

‡ These numbers differ slightly from those given in the first interim report. Three hospitals have been transferred from the fever group to the tuberculosis group to which they rightly belong. Three under one authority returned on a single form have been counted as one. An additional few questionnaires were sent to general and special hospitals since the first interim report was compiled. From the tuberculosis group have been deleted certain duplications and tuberculosis hospitals with only out-patients' departments.

It must therefore be remembered that the relative position shown for these various types of hospitals may not be true for all such hospitals. All that it is possible to show is a picture of such conditions as exist in a certain number of hospitals of each kind, the sample being reasonably large in each group.

5. It is the aim of this Report merely to set out in statistical form this picture of conditions; no comment is made on the results shown for the various factors under discussion. The statistical examination of these factors is only one part of the large amount of evidence submitted to the Commission, and it is obvious that conclusions must be drawn from all the information at their disposal and not from any one source, such as this statistical material forms.

In analysing the replies to the questionnaire the 12 groups of hospitals were at first kept distinct. Inspection of the figures showed that in many questions the hospitals approved for partial training—i.e., the Affiliated, Associated, and Reciprocal hospitals did not differ appreciably from one another. For the purpose of simplifying the tables these have therefore been grouped together in all but a few of the tables, while for a few questions the results are shown only for all the 12 groups of hospitals combined, references being made to the few distinct differences observed without reproducing the figures.

## The Nursing Staff.

6. *Nurses Covered by Inquiry.*—In Table I. the numbers of the various types of hospitals dealt with in this study are set out. In Table II. is given the nursing staff that these hospitals employ, both their

### Table II.

THE NURSING STAFF EMPLOYED BY THE HOSPITALS RETURNING THE QUESTIONNAIRE.

*Question 1.*—What is your full establishment of A, Sisters; B, Staff Nurses; C, Probationers?
*Question 2.*—What number of A, B, and C have you working at the present time?

| Type of hospital. | No. of hospitals. | Full establishment. | | | Working at present. | | | Working at present as percentage of full establishment. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Sisters. | Staff Nurses. | Probationers. | Sisters. | Staff Nurses. | Probationers. | Sisters. | Staff Nurses. | Probationers. |
| Approved as Complete Training Schools— | | | | | | | | | | |
| London Voluntary .. | 32 | 706 | 972 | 2483 | 692 | 948 | 2462 | 98·0 | 97·5 | 99·2 |
| Provincial Voluntary .. | 122 | 1489 | 1238 | 5472 | 1483 | 1137 | 5328 | 99·6 | 91·8 | 97·4 |
| London and Provincial Municipal .. .. | 60 | 937 | 703 | 4276 | 890 | 610 | 4086 | 95·0 | 86·8 | 95·6 |
| L.C.C.* .. .. | — | — | — | — | — | — | — | — | — | — |
| Approved for Partial Training— | | | | | | | | | | |
| Affiliated .. .. | 41 | 165 | 93 | 440 | 162 | 83 | 427 | 98·2 | 89·2 | 97·0 |
| Associated .. .. | 19 | 122 | 55 | 474 | 119 | 45 | 449 | 97·5 | 81·8 | 94·7 |
| Reciprocal .. .. | 19 | 167 | 209 | 529 | 164 | 169 | 488 | 98·2 | 80·9 | 92·2 |
| Approved for Special Training— | | | | | | | | | | |
| Children .. .. | 19 | 205 | 136 | 913 | 202 | 117 | 887 | 98·5 | 86·0 | 97·2 |
| Fever .. .. .. | 43 | 279 | 433 | 1168 | 257 | 400 | 1032 | 92·1 | 92·4 | 88·4 |
| Mental† .. .. | 57 | 804 | 1396 | 3146 | 792 | 1377 | 2998 | 98·5 | 98·6 | 95·3 |
| Not approved as Training Schools— | | | | | | | | | | |
| General‡ .. .. | 109 | 236 | 264 | 636 | 229 | 245 | 627 | 97·0 | 92·8 | 98·6 |
| Special‡ .. .. | 56 | 225 | 215 | 569 | 224 | 197 | 557 | 99·6 | 91·6 | 97·9 |
| Tuberculosis .. .. | 64 | 264 | 394 | 699 | 260 | 377 | 662 | 98·5 | 95·7 | 94·7 |
| Total .. .. | 641 | 5599 | 6108 | 20,805 | 5474 | 5705 | 20,003 | 97·8 | 93·4 | 96·1 |
| Mental .. .. .. | 18 | — | — | — | | 3203 | | — | — | — |
| L.C.C. .. .. .. | 27 | — | — | — | | 9400 | | — | — | — |
| Total .. .. | 686 | — | — | — | | 43,785 | | — | — | — |

* Much of the evidence was provided for the London County Council hospitals in bulk, and could not be subdivided for special categories. The total nursing staff employed at hospitals under the Medical Officer of Health to the L.C.C. is set out at the end of the table.

† Does not include 18 hospitals, placed at the bottom of the table, which did not differentiate between the various types of nursing staff. Sisters also in some cases include charge nurses, and staff nurses include assistant charge nurses. Male staff are excluded.

‡ In these hospitals sisters may include matron—for example, no sister employed, one matron; staff nurses may include assistant nurses unqualified, and probationers may include V.A.D.'s. In all cases the staff has been included under the category into which the hospital itself classified them, and in which capacity they were, therefore, apparently acting.

full establishment and the number that were working at the time the questionnaire was filled in. This shows that the information collected from these 686 hospitals relates to the conditions of service of a nursing staff numbering nearly 44,000.

7. *Ratio of Working Staff to Full Establishment.*—The ratio of the staff working when the questionnaire was filled in to the full establishment gives some indication of the *amount* of shortage existing. Taking all the hospitals together the deficiency in numbers is not very great, though if, as is probable for economic reasons, the full establishment represents a minimum of nurses required, then any numerical deficiency must imply extra responsibility for those working in the wards. The deficiency amounts to 125 sisters, or 2 per cent. of the full establishment; 403 staff nurses, or 6½ per cent. of the full establishment, and 802 probationers, or 4 per cent. of the full establishment. Taking the various types of hospitals separately, the deficiency of sisters does not vary very much, the worst example being the Fever hospitals, which report a defect of 8 per cent. There is, on the other hand, an appreciable difference in the numbers of staff nurses lacking. In the London Voluntary hospitals the defect is only 2½ per cent., while in the Provincial Voluntary hospitals it is 8 per cent. The London and Provincial Municipal hospitals show a deficiency of 13 per cent., while the Associated and Reciprocal hospitals have nearly one-fifth of their full establishment of staff nurses lacking. As regards probationers only one group of hospitals (Fever) is as much as 10 per cent. in defect of its full complement; the proportions for the other groups vary between 1 per cent. deficiency in the London Voluntary hospitals and 8 per cent. in the Reciprocal hospitals. These numerical deficiencies somewhat understate the position, since amongst those "working at present" are included "temporary nurses," of whom (as shown in Table V.) there were 426 in 644 hospitals. In addition, as evidence of the general problem the figures are inadequate, since they relate merely to quantity and not to quality. The numbers may be present while the characteristics of a *suitable* staff may be lacking. This question is dealt with in the next section, but before turning to it there is a further point of interest arising from Table II. This is the ratio of untrained to trained staff,[4] figures for which are set out in Table III.

8. *Ratio of Untrained to Trained Staff.*—For all the hospitals combined, this ratio, it will be seen, is slightly below two of untrained staff to every one of trained staff. It varies from over two and a half untrained to one trained in Municipal, Associated, and Children's hospitals to under one and a half in Reciprocal, Mental, and London Voluntary hospitals. The true ratio may be higher in some groups. For example, in the returns from hospitals not approved as training schools, "assistant nurses" who are not trained—i.e., not State-registered nurses—are included among the trained staff. It will be noted that in nine out of the 12 groups of hospitals the ratio of untrained to trained is slightly higher amongst the actual staff working than amongst the normal full establishment. This is a reflection of the lack of staff nurses, and, perhaps, some indication of a tendency to fill the places of trained with untrained staff.

[4] For purposes of this comparison staff nurses as well as sisters are counted as trained staff, though it is recognised that in some training hospitals student nurses in their final year act as staff nurses. The effect of this practice must be that the figures in Table III. understate the ratio of untrained to trained staff.

## Evidence of Shortage of Nursing Staff.

9. The evidence as to the extent to which difficulties are met with in securing a *suitable staff* was discussed in respect to five groups of hospitals in the first interim report, in connexion with replies to question 4, "Do your advertisements for sisters, staff nurses, and probationers usually bring sufficient replies from suitable candidates?" (in conjunction with question 3, relating to waiting lists). This evidence is now supplemented by replies from other hospitals, shown in Table IV. Taking all the hospitals together it will be noticed that, roughly, *one-fifth of them fail to secure suitable candidates as sisters, and one-half of them fail to secure the staff nurses and probationers of the standard that they require.* These figures show the existence of a very much more serious problem than was suggested by the relatively small numerical deficiency shown in Table II. above.

10. The difficulty experienced varies very widely amongst the 12 types of hospitals. As regards *Sisters*, the London Voluntary hospitals and the

TABLE III.

RATIO OF UNTRAINED STAFF (PROBATIONERS) TO TRAINED STAFF* (SISTERS AND STAFF NURSES).

| Type of hospital. | Number of Untrained Staff to each one of Trained Staff. | |
|---|---|---|
| | Full establishment. | Working at present |
| Approved as Complete Training Schools— | | |
| London Voluntary (32) † .. .. .. | 1·48 | 1·50 |
| Provincial Voluntary (122) .. .. .. | 2·01 | 2·03 |
| London and Provincial Municipal (60) .. | 2·61 | 2·72 |
| Approved for Partial Training— | | |
| Affiliated (41) .. .. .. .. .. | 1·71 | 1·74 |
| Associated (19) .. .. .. .. | 2·68 | 2·74 |
| Reciprocal (19) .. .. .. .. | 1·41 | 1·47 |
| Approved for Special Training— | | |
| Children (19) .. .. .. .. .. | 2·68 | 2·78 |
| Fever (45) .. .. .. .. .. | 1·64 | 1·57 |
| Mental (57) .. .. .. .. .. | 1·43 | 1·38 |
| Not approved as Training Schools— | | |
| General (109) .. .. .. .. .. | 1·27 | 1·32 |
| Special (56) .. .. .. .. .. | 1·29 | 1·32 |
| Tuberculosis (64) .. .. .. .. | 1·06 | 1·04 |
| Total .. .. .. .. .. | 1·77 | 1·79 |

* In this table staff nurses or "assistant nurses" acting as staff nurses have been included under the heading "Trained Staff."

† In this and other tables a number in parenthesis against any group of hospitals indicates the number of hospitals on which the figures are based.

hospitals for Reciprocal training and for Children do not find it hard to fill their vacancies with suitable candidates. At the other extreme come six groups of hospitals—Affiliated, Fever, Mental, General non-approved, Special non-approved, and Tuberculosis—in which approximately one-third cannot secure the candidates they require. Amongst the Provincial Voluntary and London and Provincial Municipal hospitals about one-seventh experience difficulty.

11. As regards *Staff Nurses*, even in the groups of hospitals finding least difficulty, at least 30 per cent. cannot attract sufficient numbers of suitable candidates. The proportion is at this lowest point, roughly one-third, amongst the London Voluntary, the Mental, and the Special non-approved hospitals. It is at its highest amongst Affiliated hospitals and hospitals for Reciprocal Training, and amongst General hospitals (not approved as training schools), when the proportion experiencing difficulty reaches *very nearly three-quarters* of all these hospitals. In London and Provincial Municipal hospitals nearly two-thirds fail to get candidates, while in the remaining types of hospitals—Provincial Voluntary, Associated, Children, Fever, and Tuberculosis—the proportion suffering from a shortage fluctuates round about one-half.

12. Turning finally to *Probationers*, in 8 of the 12 groups—Provincial Voluntary, Affiliated, Associated, Reciprocal, Mental, General non-approved, Special non-approved, and Tuberculosis—difficulties are reported from some half of the hospitals; in London and Provincial Municipal hospitals and in Fever hospitals the proportion rises to about two-thirds; in the London Voluntary hospitals it falls to one-fifth, while the Children's hospitals find least difficulty, only one-tenth reporting any shortage of candidates.

13. All the hospitals approved as Complete Training Schools find more difficulty in securing staff nurses than they experience with probationers; in the other groups, those approved for special training and non-approved, the relative difficulty varies, in some the shortage of staff nurses, in others the shortage of probationers being the more acute.

14. Taking the three categories of staff—sisters, staff nurses, and probationers—together, the least difficulty is felt by the London Voluntary hospitals and the Children's hospitals, the greatest difficulty by, perhaps, the Affiliated, the Fever and the General (non-approved) hospitals. Additional evidence of these differences is given in Table V. relating to the employment of "temporary nurses."[5] In the groups just referred to, the Affiliated, the Fever and the General non-approved hospitals, the proportion that have had to resort to this expedient is at its highest, and reaches, roughly, one-half. Amongst the Children's hospitals it is at its lowest, only 16 per cent. having employed some temporary staff. In the London and the Provincial Voluntary hospitals and in the Mental hospitals about one-fifth have employed temporary nurses, while in the other groups the proportion needing temporary assistance is in the neighbourhood of 40 per cent. In the face of this evidence it is difficult to question the belief that in all classes of institutions the difficulties of obtaining an adequate and a suitable nursing staff are considerable.

In the following tables the factors governing the selection of candidates, and the conditions of service after selection are analysed.

## Lowest Ages of Admission for Probationers.

15. Taking all the hospitals as a combined group Table VI. shows that only one-tenth of them are willing to accept probationers before they are 18 years of age. One-half of the hospitals will enter probationers at 18, one-third prefer to wait till they are aged 19. Very few place the age of entry beyond 19. Within the groups there is, however, some variation. The highest standard is set by the London Voluntary hospitals, very few of which will accept a candidate before 19 years of age, and a quarter of which require applicants to be at least 20 years old. In both of the other

### TABLE IV.

SHORTAGE OF NURSING STAFF.

*Question 3.*—Have you a waiting list for vacancies (sisters, staff nurses, and probationers)?

*Question 4.*—If not, do your advertisements for sisters, staff nurses, and probationers usually bring sufficient replies from suitable candidates?

PERCENTAGE OF HOSPITALS* IN EACH GROUP THAT REPLIED "NO" TO QUESTION (4).

| Type of hospital. | Sisters. | Staff Nurses. | Probationers. |
|---|---|---|---|
| Approved as Complete Training Schools— | | | |
| London Voluntary | 3% (31) | 31% (29) | 21% (28) |
| Provincial Voluntary | 13% (113) | 54% (100) | 42% (118) |
| London and Provincial Municipal | 15% (86) | 63% (81) | 61% (87) |
| Approved for Partial Training— | | | |
| Affiliated | 30% (37) | 71% (31) | 51% (37) |
| Associated | 18% (17) | 57% (14) | 47% (19) |
| Reciprocal | 5% (19) | 74% (19) | 58% (19) |
| Approved for Special Training— | | | |
| Children | 6% (18) | 43% (14) | 11% (19) |
| Fever | 29% (41) | 56% (41) | 67% (43) |
| Mental | 28% (65) | 35% (65) | 54% (69) |
| Not approved as Training Schools— | | | |
| General | 33% (79) | 73% (82) | 51% (78) |
| Special | 29% (45) | 37% (38) | 56% (48) |
| Tuberculosis | 33% (52) | 57% (54) | 55% (51) |
| Total | 22% (603) | 56% (568) | 51% (616) |

* In this and all succeeding tables the percentages are not necessarily based upon the total number of hospitals as given in Table I. In some cases the question may not have been answered, in others it may not have been applicable—e.g., they did not employ staff nurses.

The figures given in parentheses in each table indicate the number of hospitals upon which the percentages are based. For example, the total figures under the heading "Sisters" mean that out of 686 questionnaires returned and analysed 603 replied to the question, "Do your advertisements usually bring sufficient replies from suitable candidates?" and of those 603, 22% said "No."

[5] I am informed that "temporary nurse" and "assistant nurse" are synonyms applied to women who have worked for varying periods in hospitals but have not qualified for State Registration.

## TABLE V.

### EMPLOYMENT OF TEMPORARY NURSES.

*Question 9.*—Have you found it necessary to employ "temporary nurses"? If so, how many are working in the hospital at the present time?

| — | Approved as Complete Training Schools. | | | Approved for Partial Training. | | | Approved for Special Training. | | | Not approved as Training Schools. | | | All hospitals combined. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | London Voluntary. | Provincial Voluntary. | London and Provincial Municipal. | Affiliated. | Associated. | Reciprocal. | Children. | Fever. | Mental | General | Special. | Tuberc. | |
| Percentage that had found it necessary to employ "temporary" nurses | 22% (32) | 20% (122) | 44% (57) | 50% (40) | 37% (19) | 42% (19) | 16% (19) | 56% (43) | 24% (75) | 61% (104) | 43% (54) | 37% (60) | 38% (644) |
| Number working in hospital at time questionnaire was completed.. .. | 6 | 30 | 63 | 13 | 15 | 38 | 21 | 19 | 174 | 13 | 15 | 19 | 426 |

large groups of complete Training Schools, the Provincial Voluntary and the London and Provincial Municipal hospitals, the greater number refuse to accept candidates till 19 years of age, but over one-third of them are content with probationers at 18—an appreciably higher proportion than is seen amongst the London Voluntary hospitals. The age of entry in the remaining groups is distinctly lower. The larger part of them take their candidates at 18, and quite an appreciable number set their lowest age of admission at 17 years—e.g., 14 per cent. of the hospitals approved for partial training, 18 per cent. of the General hospitals (non-approved), and 36 per cent. of the Special hospitals (non-approved) accept probationers at 17. Two Fever hospitals and one Special hospital accept candidates at 16.

### Educational Standard Required.

16. Taking the hospitals as a combined group (Table VII.) nearly two-thirds of them desire candidates to have had a secondary education, either with or without matriculation or school-leaving certificate. The fact that 16 per cent. of them add to their qualification "secondary education" the words "if possible" is further evidence of a shortage of quality as opposed to quantity; the conditional clause suggests that to obtain sufficient staff they have to be content with a lower standard. Nearly one-third are willing to accept applicants of seventh standard level, while one-tenth make no definite requirements whatever. Amongst the last are hospitals which say that it is "useless to make any stipulation" or that they "can demand no standard," and must be content as long as the candidates "can read, write, and spell." The highest standard, Table VII. shows, is set by the hospitals for Children, only 5 per cent. of which are satisfied with an educational level lower than secondary education. Amongst the London Voluntary hospitals, the Provincial Voluntary hospitals, the hospitals approved for partial training, the non-approved General, and Special hospitals, the greater number, two-thirds to three-quarters demand or desire a secondary education; amongst the Tuberculosis hospitals the level is lower, only about one-half requiring the secondary standard.

## TABLE VI.

### LOWEST AGES OF ADMISSION.

*Question 5.*—At what age do you admit probationers?

| Age of admission. | Approved as Complete Training Schools. | | | Approved for Partial Training. | Approved for Special Training. | | | Not approved as Training Schools. | | | All hospitals combined. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | London Voluntary. | Provincial Voluntary. | London and Provincial Municipal. | Affiliated, Associated and Reciprocal. | Children. | Fever. | Mental. | General. | Special. | Tuberc. | |
| 16 years .. | — | — | — | — | — | 5% | — | — | 2% | — | 1% |
| 17 „ .. | — | — | — | 14% | 5% | 7% | — | 18% | 36% | 15% | 9% |
| 18 „ .. | 13% | 35% | 40% | 56% | 84% | 76% | 73% | 65% | 52% | 64% | 53% |
| 19 „ .. | 59% | 61% | 53% | 30% | 11% | 12% | 20% | 15% | 8% | 21% | 33% |
| 20 and 21 .. | 28% | 4% | 7% | — | — | — | 7% | 2% | 2% | — | 4% |
| Total .. | 100% (32) | 100% (122) | 100% (87) | 100% (79) | 100% (19) | 100% (43) | 100% (75) | 100% (87) | 100% (48) | 100% (47) | 100% (639) |

## TABLE VII.

### EDUCATIONAL STANDARD REQUIRED.

*Question 6.*—What are the educational requirements for acceptance of a probationer (seventh standard, secondary education, school-leaving certificate, matriculation, &c.)?

| Educational standard. | Approved as Complete Training Schools. | | | Approved for Partial Training. | Approved for Special Training. | | | Not approved as Training Schools. | | | All hospitals combined. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | London Voluntary. | Provincial Voluntary. | London and Provincial Municipal. | Affiliated, Associated and Reciprocal. | Children. | Fever. | Mental. | General. | Special. | Tuberc. | |
| Secondary or matriculation or school-leaving certificate | 61% | 61% | 6% | 48% | 90% | 30% | 14% | 55% | 64% | 45% | 43% |
| Secondary if possible .. | 10% | 20% | 13% | 17% | 5% | 33% | 9% | 20% | 14% | 8% | 16% |
| 7th Standard . | 13% | 13% | 70% | 25% | 5% | 28% | 59% | 15% | 10% | 33% | 30% |
| No definite requirements. | 16% | 6% | 11% | 10% | — | 9% | 18% | 10% | 12% | 14% | 11% |
| Total .. | 100% (31) | 100% (122) | 100% (87) | 100% (79) | 100% (19) | 100% (43) | 100% (74) | 100% (93) | 100% (49) | 100% (49) | 100% (646) |

The London and Provincial Municipal hospitals and the Mental hospitals differ strikingly from all these groups; less than a quarter of them demand candidates of secondary education and over three-quarters of them accept the applicant of seventh standard, or have no definite educational requirements at all.

### Accommodation.

17. Two-thirds of all the hospitals provide separate bedrooms (Table VIII.) for all, or very nearly all, their probationers; one-third do not do so. The best groups in this respect are the London Voluntary, the Provincial Voluntary, the London and Provincial Municipal and the Mental hospitals, in which approximately three-quarters supply separate bedrooms. In the non-approved General and Special hospitals the proportion falls to only just over one-half, while the remaining groups—hospitals approved for partial training, Children, Fever, and Tuberculosis—occupy an intermediate position with two-thirds supplying separate bedrooms.

### Provision of Wardmaids.

18. As regards the employment of wardmaids (Table IX.) implying the reduction of domestic work by the nursing staff, the London Voluntary hospitals and the Fever hospitals have a definitely larger domestic staff, in relation to the average number of occupied beds, than any of the other groups.[6] Very few of these two groups of hospitals (about one-tenth) have more than 20 beds per wardmaid, while three-quarters of them provide one wardmaid to every 10 to 20 beds. On the other hand, there are more than 20 beds per wardmaid in about one-quarter to one-third of seven groups of hospitals (Provincial Voluntary, London and Provincial Municipal, the three groups approved for partial training, and Special) and in one-half of the Children's hospitals and Tuberculosis hospitals. The General and Special non-approved hospitals differ widely amongst themselves. As was noted in the first interim report, a high proportion have one wardmaid to each 20 or fewer beds (though this may be illusory, the wardmaids being part-time workers and having other duties), while, at the other extreme an appreciable proportion apparently provide no domestic help at all in the wards (though again they may do so with

[6] Here and in other tables "beds" indicates average number of occupied beds and not total number of beds available.

## TABLE VIII.

### PROVISION OF BEDROOMS.

*Question 8.*—Is a separate bedroom provided for each probationer?

| — | Approved as Complete Training Schools. | | | Approved for Partial Training. | Approved for Special Training. | | | Not approved as Training Schools. | | | All hospitals combined. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | London Voluntary. | Provincial Voluntary. | London and Provincial Municipal. | Affiliated, Associated and Reciprocal. | Children. | Fever. | Mental. | General. | Special. | Tuberc. | |
| All, or very nearly all separate .. | 74% | 74% | 74% | 66% | 63% | 63% | 73% | 57% | 56% | 67% | 67% |
| Not separate.. | 26% | 26% | 26% | 34% | 37% | 37% | 27% | 43% | 44% | 33% | 33% |
| Total .. | 100% (31) | 100% (122) | 100% (87) | 100% (79) | 100% (19) | 100% (43) | 100% (75) | 100% (102) | 100% (54) | 100% (58) | 100% (670) |

## TABLE IX.

### NUMBER OF BEDS PER WARDMAID.

*Question 10.*—How many domestic workers (orderlies, wardmaids, or daily workers) are employed on ward duty only? [*Correlated with answers to Question 11 on the average number of occupied beds.*]

| No. of beds per wardmaid. | Approved as Complete Training Schools. | | | Approved for Partial Training. | Approved for Special Training. | | | Not approved as Training Schools. | | | All hospitals combined. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | London Voluntary. | Provincial Voluntary. | London and Provincial Municipal. | Affiliated, Associated and Reciprocal. | Children. | Fever. | Mental. | General. | Special. | Tuberc. | |
| Under 10 beds | 14% | — | 9% | 5% | — | 11% | 4% | 33% | 19% | 12% | 12% |
| 10–20 beds .. | 77% | 69% | 62% | 58% | 50% | 78% | 4% | 41% | 48% | 36% | 48% |
| 20–30 „ .. | 9% | 29% | 17% | 25% | 42% | 11% | 3% | 9% | 22% | 25% | 18% |
| 30 and over .. | — | 2% | 10% | 8% | 8% | — | 5% | — | — | 27% | 6% |
| No ward domestic staff | — | — | 2% | 2% | — | — | 81% | 17% | 9% | — | 15% |
| Inmate labour | — | — | — | 2% | — | — | 3% | — | 2% | — | 1% |
| Total .. | 100% (22) | 100% (92) | 100% (47) | 100% (69) | 100% (12) | 100% (36) | 100% (73) | 100% (87) | 100% (46) | 100% (52) | 100% (527) |

part-time workers). Mental hospitals fall in a category entirely distinct from all other types. Over four-fifths of them provide no domestic help in the wards, the work being done apparently, though it was only occasionally so stated, by the patients.

### Number of Beds in Relation to Nursing Staff.

19. The ratio of beds to total nursing staff at work (sisters, staff nurses and probationers) is distinctly lowest in the London and Provincial Voluntary hospitals and in the hospitals for Children, in which groups very few hospitals have three or more than three beds to each one of nursing staff (Table X.). The London Voluntary hospitals show the lowest figures, since all of them have less than three beds per one of "staff." The Municipal hospitals work on a definitely higher ratio, 95 per cent. of them having three or more beds per nursing staff and over half of them working on a ratio of between 4 to 6 beds. In most of the other groups a wide range exists, some working to the ratio of the Voluntary hospitals, others to the ratio of the Municipal hospitals. In these cases the type of hospital does not seem to denote any uniformity in fixing the ratio. The majority, however, of General non-approved hospitals work to a low ratio. The Mental and Tuberculosis hospitals work to an especially high ratio, two-thirds of them having more than six beds to each "nursing staff."

20. Apart from opinions on the reasons for the shortage of candidates (Question 12)—which was dealt with in the first interim report and is discussed again on page xxiii. below—this completes the evidence collected from questionnaires filled in on behalf of the General and Special hospitals not approved as training schools. As regards Tuberculosis hospitals, the next five questions dealt with (Questions 14–18)

## TABLE X.

### NUMBER OF BEDS PER NURSING STAFF.

*Question 11.*—What is the average number of beds occupied per night over a year? [*Correlated with answers to Question 2 on the nursing staff employed by each hospital.*]

| No. of beds per nursing staff. | Approved as Complete Training Schools. | | | Approved for Partial Training. | Approved for Special Training. | | | Not approved as Training Schools. | | | All hospitals combined. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | London Voluntary. | Provincial Voluntary. | London and Provincial Municipal. | Affiliated, Associated and Reciprocal. | Children. | Fever. | Mental. | General. | Special. | Tuberc. | |
| 1·0– .. | 10% | 7% | — | 17% | 24% | 7% | 5% | 23% | 18% | — | 11% |
| 2·0– .. | 90% | 89% | 5% | 37% | 64% | 34% | 3% | 55% | 32% | — | 42% |
| 3·0– .. | — | 3% | 26% | 14% | 6% | 54% | 3% | 13% | 30% | 11% | 15% |
| 4·0– .. | — | 1% | 56% | 20% | 6% | 5% | 19% | 6% | 10% | 24% | 15% |
| 6·0– .. | — | — | 13% | 5% | — | — | 38% | 3% | 10% | 36% | 10% |
| 8·0 and over.. | — | — | — | 7% | — | — | 32% | — | — | 29% | 7% |
| Total .. | 100% (29) | 100% (115) | 100% (59) | 100% (71) | 100% (17) | 100% (41) | 100% (62) | 100% (95) | 100% (50) | 100% (54) | 100% (593) |

## TABLE XI.

### RECRUITMENT OF PROBATIONERS.

*Question 14.*—How many probationers did you admit in 1928, 1929, 1930?
*Question 15.*—How many candidates passed the final S.R.N. last year?

| Type of hospital. | Number of hospitals giving information. | Full establishment of probationers in these hospitals. | Probationers admitted in— | | | Admitted as percentage of full establishment of probationers— | | | Number of candidates passing final S.R.N. in 1930. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1928. | 1929. | 1930. | 1928. | 1929. | 1930. | Absolute numbers. | As per cent. of full establishment. |
| Hospitals approved for Complete Training— | | | | | | | | | | |
| London Voluntary .. | 30 | 2446 | 1147 | 1232 | 1326 | 47% | 50% | 54% | 690 | 28% |
| Provincial ,, .. | 114 | 5265 | 2235 | 2314 | 2485 | 42% | 44% | 47% | 1103 | 21% |
| London and Provincial Municipal .. .. | 59 | 4239 | 1389 | 1706 | 1806 | 33% | 40% | 43% | 655 | 15% |
| Hospitals approved for Partial Training .. | 61 | 1197 | 653 | 635 | 697 | 55% | 53% | 58% | Not applicable. | |
| Hospitals approved for Special Training— | | | | | | | | | | |
| Children .. .. | 16 | 648 | 314 | 318 | 329 | 48% | 49% | 51% | 116 | 18% |
| Fever .. .. .. | 37 | 1043 | 602 | 647 | 651 | 58% | 62% | 62% | Not applicable. | |
| Mental .. .. | 46 | 2268 | 1562 | 1595 | 1569 | 69% | 66% | 69% | ,, | |
| Total .. .. | 363 | 17,106 | 7902 | 8357 | 8863 | 46% | 49% | 52% | — | |

are inapplicable to these hospitals, but further evidence as regards their conditions of service appears in Tables XIV. and in subsequent tables.[7]

### Recruitment and Loss of Staff.

21. In Table XI. is set out the number of probationers that these various hospitals admitted in the three years 1928, 1929, and 1930, and the number of candidates within them that passed the final S.R.N. examinations in 1930. When the entries are taken as a percentage of the total establishment of probationers employed, it is seen that *every year* these hospitals (as a combined group) admit, roughly, ***half their full establishment of probationers***. In other words, they have to replace annually half their staff of pro-

[7] Question 13 was a request for a training school prospectus.

## TABLE XII.

### LOSS OF PROBATIONERS.

*Question 16.*—Of the nurses who failed to complete their training in 1928, 1929, and 1930, how many left—during their first year, during their second year, and during their third year—as a result of (*a*) ill-health; (*b*) marriage; (*c*) failure to pass examinations; (*d*) sickness at home; and (*e*) other causes?

| Type of hospital. | Total number of nurses leaving in 1928, 1929, and 1930. | One-third of those leaving as percentage of full establishment of probationers. | Number leaving during their first year. | Number leaving during their second year. | Number leaving during their third year. | Number leaving in each year as percentage of total number leaving in three years. | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | First year. | Second year. | Third year. |
| Hospitals approved for Complete Training— | | | | | | | | |
| London Voluntary .. .. | 1039 | 14% | 797 | 195 | 47 | 77% | 19% | 4% |
| Provincial ,, .. .. | 1918 | 12% | 1488 | 296 | 134 | 78% | 15% | 7% |
| London and Provincial Municipal .. .. .. .. | 1282 | 10% | 945 | 254 | 83 | 74% | 20% | 6% |
| Approved for Partial Training .. | 745 | 21% | 628 | 102 | 15 | 84% | 14% | 2% |
| Hospitals approved for Special Training— | | | | | | | | |
| Children.. .. .. .. | 323 | 17% | 263 | 52 | 8 | 81% | 16% | 3% |
| Fever .. .. .. .. | 899 | 29% | 703 | 132 | 64 | 78% | 15% | 7% |
| Mental .. .. .. .. | 2507 | 37% | 1620 | 584 | 303 | 65% | 23% | 12% |
| Total .. .. .. | 8713 | 17% | 6444 | 1615 | 654 | 74% | 19% | 7% |

bationers, though with a 3 to 4 years' course only one-quarter to one-third of the establishment would be required if all probationers remained in hospital till they became qualified. Within the groups of hospitals there is no very marked variation; in 1930, with two exceptions, they all admitted probationers to the extent of approximately 50 per cent. of their full establishment. The two exceptions are the Fever hospitals (2 years' course) and Mental hospitals that admitted even a still higher percentage, approaching two-thirds of their full establishment. It will be observed that in the great majority of the groups the number of probationers admitted has increased between 1928 and 1930—i.e., the requirements of these hospitals seem to be increasing.

The question as to the numbers passing the final S.R.N. examination is not strictly applicable to all the groups, and only the figures supplied by the London and Provincial Voluntary and Municipal hospitals and by the Children's hospitals were analysed. In the Voluntary hospitals, London and Provincial, about one-quarter of the full establishment of probationers passed this examination in 1930, in the Municipal hospitals and the Children's hospitals the proportion was about one-sixth. The large differences between these figures relating to those passing the examination, one-sixth to one-quarter of the establishment, and the numbers of probationers that are *admitted*, one-half of the establishment, suggest an appreciable "wastage" between entry and final examination. Table XII. endeavours to give some numerical appreciation of this wastage.[8] In this table is given the number of probationers who left in 1928, 1929, and 1930. One-third of this total has been taken as representative of the average yearly number of "exits," and this third has then been taken as a percentage of the full establishment of probationers (as shown in Table XI.). The figures show that for all the hospitals combined nearly one-fifth of the full establishment of probationers leave annually. The only distinct variations from this figure are found amongst the Municipal hospitals, which annually lose a smaller proportion, only about one-tenth of their full establishment, and amongst the Fever hospitals, which lose at least one-quarter, and the Mental hospitals, in which the loss is as high as one-third. Taking the four groups of hospitals that gave adequate replies to all three questions 14, 15, and 16, the figures can be put in the form shown in Table XIIa.

Owing to the fact that these figures are not related to the same years, the passes and exits do not add up to the entries as they should do (the discrepancy in the percentages varies from 8 to 14), but they are perhaps sufficient to show (*a*) that these hospitals must annually replace 40 to 50 per cent. of their full establishment of probationers; (*b*) that annually they turn out some quarter of their establishment of probationers with the final S.R.N. qualification; (*c*) that annually they must lose one-third of their annual entry or, in other words, more than one-tenth of their establishment of probationers without their becoming qualified. Table XII. shows that over three-quarters of this loss occurs during the first year after admission of the probationer. (Part of the discrepancy noted above may be due to this loss being understated, through omission amongst the "exits" of candidates who never survived the preliminary training schools.) The numbers of nurses who leave in the second and third years are relatively small. The reasons for withdrawal from training have not been closely analysed, as the answers cannot be accurately interpreted. For instance, such reasons as "unsuited for a nurse's life" may imply "ill-health"; "wanted at home," may imply "sickness at home"; "dislike of the work" may in effect mean failure to cope with the theoretical requirements. By far the greater proportion were stated as having left in their first year owing to inefficiency (which may include failure to pass examinations), unsuitability (which may include reasons of health), or dislike of the work. This suggests that these hospitals are recruiting a considerable number of candidates who are never likely to become efficient nurses, and are eliminated after a few months' trial period. One hospital, in fact, reports "we have to engage all who apply and weed out later."

TABLE XIIa.

| Hospitals. | Average yearly entries, 1928–30. | Number passing S.R.N. final examination in 1930. | Average yearly exits, 1928–30. |
|---|---|---|---|
| | As percentage of full establishment of probationers. | | |
| London Voluntary .. | 50% | 28% | 14% |
| Provincial „ .. | 45% | 21% | 12% |
| London and Provincial Municipal .. .. | 39% | 15% | 10% |
| Children .. .. .. | 49% | 18% | 17% |

22. Amongst the Mental hospitals, on the other hand, an appreciable number do leave during the second and third years of training, the reason most constantly given being a desire for "a change of work," a change which the nurse in the Mental hospital is more able to seek, inasmuch as often she is not required to sign a binding agreement. Moreover, even in approved training schools for mental nursing, probationers are not always expected to take examinations leading to State registration.

### Length of Training Course.

23. The General Nursing Council for England and Wales has laid down conditions under which hospitals are approved as training schools. For Complete Training Schools the period of training must be not less than three years. Table XIII. shows that one-quarter of the London Voluntary hospitals and one-fifth of the Provincial Voluntary hospitals go beyond this requirement and extend the course to four years; only 6 per cent. of the Municipal hospitals make this extension.

In Affiliated hospitals the period of training must extend over four years, of which the first two years must be spent in the smaller hospital. With one exception all these hospitals fulfil this condition, and do not go beyond it. The same rule applies to hospitals for Reciprocal training. As to hospitals which

[8] The entries, examination "passes," and "exits" cannot be accurately related to one another since the questions did not relate to precisely the same years. The entries relate to 1928–30, the "passes" to 1930, and the "exits" to 1925–30.

## TABLE XIII.

### LENGTH OF TRAINING COURSE.

*Question 17.*—What is the length of the training course?
*Question 18.*—Do probationers have to undertake to work for the hospital for a year after completion of training?

| Length of Training Course. | Approved as Complete Training Schools. | | | Approved for Partial Training. | | | Approved for Special Training. | | | All hospitals combined. |
|---|---|---|---|---|---|---|---|---|---|---|
| | London Voluntary. | Provincial Voluntary. | London and Provincial Municipal. | Affiliated. | Associated. | Reciprocal. | Children. | Fever. | Mental. | |
| Under 2 years .. .. | — | — | — | 2%* | 5%† | — | — | 10%‡ | — | 1% |
| 2 years .. .. .. | — | — | — | 98% | 11% | 100% | — | 74% | — | 20% |
| 3 or 3½ years .. .. | 75% | 80% | 94% | — | 56% | — | 100% | 16% | 97% | 69% |
| 4 years .. .. .. | 25% | 20% | 6% | — | 28% | — | — | — | 3% | 10% |
| Total .. .. | 100% (32) | 100% (121) | 100% (87) | 100% (41) | 100% (18) | 100% (18) | 100% (19) | 100% (43) | 100% (71) | 100% (450) |
| Percentage of hospitals that require probationers to work for a year after completion of training. | 13% (32) | 9% (121) | 3% (74) (1 hospital requires 6 mths.). | None (41) | None (17) (1 hospital requires 6 mths.). | None (18) | None (19) | None (43) | 1% (75) | 4% (440) |

* 1 hospital with no probationers training for S.R.N.
† 1 hospital belonging to the Associated list replies "18 months, affiliated."
‡ 2 affiliated, 2 not training for State examination.

give training for supplementary registers, the prescribed course in Children's hospitals must extend over three years, and in Fever hospitals over two years. The Reciprocal hospitals here, accordingly, all require two years to be spent in them, but some of the Fever hospitals state that they require the candidate to follow a 3 to 3½ years' course, and some of the Children's hospitals demand 3½ years, being six months more than the period prescribed by the General Nursing Council.

In Associated hospitals the period of training must extend over 3½ years, of which not less than six

## TABLE XIV.

### FEES FOR TRAINING.

*Question 19.*—How much (if any) fee or deposit has to be paid by probationers on starting training?

| Fee or Deposit. | Approved as Complete Training Schools. | | | Approved for Partial Training. | Approved for Special Training. | | | Not approved as Training School. | All hospitals combined. |
|---|---|---|---|---|---|---|---|---|---|
| | London Voluntary. | Provincial Voluntary. | London and Provincial Municipal. | Affiliated, Associated and Reciprocal. | Children. | Fever. | Mental. | Tuberc. | |
| None .. .. .. | 75% | 88% | 100% | 96% | 79% | 89% | 96% | 100% | 92% |
| £2 2*s.* .. .. .. | — | 1% | — | — | 5% | — | — | — | 3% |
| £3 3*s.* .. .. .. | — | 2% | — | 1% | — | 2% | 1% | — | |
| £4 4*s.* .. .. .. | — | 2% | — | 1% | — | 7% | — | — | |
| £5 5*s.* .. .. .. | 6% | 6% | — | 1% | 11% | — | 3% | — | 4% |
| £6 6*s.* .. .. .. | 13% | — | — | — | 5% | — | — | — | |
| £7 7*s.* .. .. .. | 3% | — | — | — | — | — | — | — | |
| £15 15*s.* .. .. .. | 3% | — | — | — | — | — | — | — | |
| £25 .. .. .. | — | 1% | — | — | — | — | — | — | 1% |
| 1 month's pay .. .. | — | — | — | — | — | 2% | — | — | |
| 2 months' pay .. .. | — | — | — | 1% | — | — | — | — | |
| Total .. .. | 100% (32) | 100% (122) | 100% (87) | 100% (77) | 100% (19) | 100% (43) | 100% (75) | 100% (45) | 100% (500) |

months must be spent in the hospital with which they are associated. According to the replies given, the time spent in these Associated hospitals varies considerably; in one-tenth two years is required, in about one-half 3–3½ years is required, and in about one-quarter four years is required. (This may include time spent at the second hospital, the replies not always being quite clear.)

In Mental hospitals approved by the General Nursing Council the period of training must be not less than three years; 97 per cent. of these hospitals fulfil this condition only; 3 per cent. extend it to four years.

24. Except amongst the Voluntary hospitals, London and Provincial, very rarely is there any requirement for probationers to undertake a further year's work for the hospital after completion of training. 13 per cent. of the London Voluntary and 9 per cent. of the Provincial hospitals make this stipulation (lower half of Table XIII.).

### Fees for Training.

25. Out of 500 hospitals only 40, or 8 per cent., make any charge for training, and in only two cases does the fee exceed seven guineas (Table XIV.) Differences between the groups are not very large, the extremes being the London Voluntary and Children's hospitals, of which approximately one-quarter make some charge, and the Municipal and Reciprocal hospitals, amongst which no hospital demands any fee.

### Pay of Staff.

26. *First Year.*—In the amount of pay given to first year probationers there is a wide variation (Table XV.), the extreme range being from £12 per annum to £48 per annum. Between the groups of hospitals quite distinct differences can be seen. The lowest scale is to be found amongst the hospitals for Children, over half of which pay less than £20 per annum, and only one-tenth of which pay more than this figure (one-third paying exactly £20). The highest scale is to be found amongst the Fever hospitals, of which none pays less than £21 per annum, and nearly 90 per cent. pay £30 or over.

Although overlapping occurs, the Municipal hospitals offer a definitely higher level of pay than the London and Provincial Voluntary hospitals. In the latter group, few pay more than £20 per annum, one-half to two-thirds paying exactly this figure. In the former, three-quarters pay £30 or more, two-thirds paying exactly £30. The broad tendency, obviously, is for Municipal hospitals to pay to first year probationers £10 per annum more than the Voluntary hospitals.

## TABLE XV.

### PAY OF STAFF.

*Question 20.*—How much are probationers and trained staff paid: (*a*) first year; (*b*) second year; (*c*) third year; (*d*) staff nurses, if different from third-year nurses; (*e*) sisters?

(*a*) FIRST YEAR PROBATIONERS.

| Pounds per annum. | Approved as Complete Training Schools. | | | Approved for Partial Training. | Approved for Special Training. | | Not approved as Training Schools. | All hospitals combined. |
|---|---|---|---|---|---|---|---|---|
| | Lond. Voluntary. | Provincial Voluntary. | Lond. and Provincial Municipal. | Affiliated, Associated§ and Reciprocal. | Children. | Fever. | Tuberc. | |
| Below £20* .. | 19% | 29% | 3% | 16% | 58% | — | 5% | 16% |
| £20 .. .. | 66% | 55% | 5% | 43% | 32% | — | 10% | 31% |
| £21–29 .. | 9% | 15% | 19% | 27% | 5% | 12% | 20% | 18% |
| £30 .. .. | 6% | 1% | 65% | 10% | 5% | 44% | 32% | 25% |
| Over £30† .. | — | — | 8% | 4% | — | 44% | 33% | 10% |
| Total .. | 100% (32) | 100% (113) | 100% (87) | 100% (77) | 100% (19) | 100% (43) | 100% (48) | 100% (419) |

* Minimum £12. † Maximum £48.

(*b*) SECOND YEAR PROBATIONERS.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Below £25* .. | 38% | 32% | 5% | 36% | 63% | 2% | 6% | 23% |
| £25 .. .. | 44% | 50% | 3% | 28% | 21% | — | 11% | 26% |
| £26–34† .. | 15% | 17% | 22% | 27% | 16% | 10% | 27% | 20% |
| £35 .. .. | 3% | 1% | 63% | 4% | — | 35% | 23% | 20% |
| £36–39 .. | — | — | 6% | 3% | — | 7% | 18% | 4% |
| £40 .. .. | — | — | — | 1% | — | 23% | 7% | 3% |
| Over £40‡ .. | — | — | 1% | 1% | — | 23% | 8% | 4% |
| Total .. | 100% (32) | 100% (122) | 100% (87) | 100% (72) | 100% (19) | 100% (43) | 100% (45) | 100% (420) |

* Minimum £16. † Many hospitals in this range pay £30 exactly. ‡ Maximum £51.

## TABLE XVII. §

(*c*) THIRD YEAR PROBATIONERS.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Below £30* .. | 29% | 14% | 1% | 20% | 47% | Applicable in very few cases. | 3% | 13% |
| £30 .. .. | 59% | 69% | 6% | 33% | 32% | | 3% | 40% |
| £31–39† .. | 9% | 15% | 16% | 13% | 21% | | 18% | 15% |
| £40 .. .. | 3% | 2% | 37% | 20% | — | | 35% | 15% |
| £41–44 .. | — | — | 3% | 7% | — | | 16% | 3% |
| £45 .. .. | — | — | 36% | — | — | | 13% | 12% |
| Over £45‡ .. | — | — | 1% | 7% | — | | 12% | 2% |
| Total .. | 100% (32) | 100% (122) | 100% (87) | 100% (15) | 100% (19) | | 100% (32) | 100% (307) |

* Minimum £21. † Many hospitals in this range pay exactly £35. ‡ Maximum £60. § The fourth column of percentages of Table XVII. applies only to Associated hospitals.

## TABLE XVIII.

(*d*) STAFF NURSES.

| Pounds per annum. | Approved as Complete Training Schools. | | | Approved for Partial Training. | Approved for Special Training. | | Not approved as Training Schools. | All hospitals combined. |
|---|---|---|---|---|---|---|---|---|
| | Lond. Voluntary. | Provincial Voluntary. | Lond. and Provincial Municipal. | Affiliated, Associated and Reciprocal. | Children. | Fever. | Tuberc. | |
| Below £40* .. | 6% | 3% | — | — | 6% | — | 4% | 2% |
| £40 or £45 .. | 23% | 17% | 6% | 2% | 24% | 2% | 10% | 11% |
| £50 or £55 .. | 48% | 33% | 13% | 11% | 46% | 45% | 36% | 29% |
| £60 or £65 .. | 23% | 46% | 73% | 80% | 24% | 51% | 39% | 54% |
| Over £65† .. | — | 1% | 8% | 7% | — | 2% | 11% | 4% |
| Total .. | 100% (30) | 100% (106) | 100% (79) | 100% (61) | 100% (17) | 100% (42) | 100% (49) | 100% (384) |

The figures in the first column represent initial rates of pay, which rise by amounts varying between £5 and £20. * Minimum £30. † Maximum £80.

## TABLE XIX.

(*e*) SISTERS.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Below £70* .. | 12% | 17% | 1% | 10% | 21% | — | 10% | 10% |
| £70 and £75 | 66% | 70% | 40% | 74% | 53% | 39% | 30% | 55% |
| £80 and £85 .. | 13% | 12% | 57% | 11% | 21% | 48% | 48% | 29% |
| £90 and over† | 9% | 1% | 2% | 5% | 5% | 13% | 12% | 6% |
| Total .. | 100% (32) | 100% (119) | 100% (85) | 100% (74) | 100% (19) | 100% (38) | 100% (58) | 100% (425) |

The figures in the first column represent initial rates of pay which rise by amounts varying between £10 and £30, the highest rate reported being £150, though the maximum is most frequently £90–£110. * Minimum £60 initial pay. † Maximum £100 initial pay.

The hospitals approved for partial training, the Affiliated, Associated, and Reciprocal hospitals, vary more widely amongst themselves, the general tendency being for them to pay higher rates than the other Voluntary hospitals but not so high as the Municipal hospitals. The Tuberculosis hospitals pay on the higher scale, though not so highly as the Fever hospitals, 65 per cent. paying £30 and over, against the corresponding 88 per cent. amongst the Fever hospitals.

27. *Second and Third Years.*—In these later years of training the relative positions of the various types of hospitals do not alter (Tables XVI. and XVII.). Children's hospitals pay on a lower scale, Fever and Tuberculosis hospitals on a high scale. The Municipal hospitals offer higher rates than the London and Provincial Voluntary hospitals. In the latter about one-half pay £25 per annum during the second year (one-third still paying less than this) and about two-thirds pay £30 per annum during the third year. In the Municipal hospitals two-thirds pay £35 per annum in the second year and three-quarters pay £40–45 in the third year—i.e., they pay, as a whole, £10 per annum more than the Voluntary hospitals. The hospitals approved for partial training remain closer to the scale of the other Voluntary hospitals, though appreciable numbers of them pay higher rates. Three-quarters of the hospitals for children pay £30 or less in the third year of training.

28. *Staff Nurses.*—The salaries of staff nurses vary between extremes of £30 and £80 per annum (Table XVIII.). Taking the hospitals as a whole one-half pay £60–65, about one-third pay £50–55 (these being initial rates of pay which rise to rates varying between £5 and £20 higher than the initial rates). The Provincial Voluntary hospitals tend to pay higher rates than the Voluntary hospitals in London, nearly one-half of the former paying £60–65 against only one-quarter in London. The Municipal hospitals pay higher rates than either of these groups, for three-quarters of them pay £60–65; their rates, however, are not higher than those offered in the hospitals approved for partial training. Relatively these last hospitals (i.e., Affiliated, Associated, and Reciprocal) hold a distinctly higher position in regard to pay for trained staff than they occupy with regard to probationers; on the other hand, Fever hospitals and Tuberculosis hospitals do not offer such relatively high rates as they do for untrained staff. Their rates for Staff Nurses are not very much higher than those offered in the Provincial Voluntary hospitals and are definitely below those of the Municipal hospitals. Children's hospitals offer lower rates but are on a par with the London Voluntary hospitals, both types being below any of the other groups.

## TABLE XIXA.

| Type of staff. | Rate of pay. Pounds per annum. | Proportion of hospitals that pay these rates. |
|---|---|---|
| Probationer 1st year .. .. | £20–30 | Three-quarters. |
| ,, 2nd ,, .. .. | £25–35 | Two-thirds. |
| ,, 3rd ,, .. .. | £30–40 | Three-quarters. |
| Staff nurses .. .. .. | £50–65* | Four-fifths. |
| Sisters .. .. .. .. | £70–85* | ,, |

* Initial rate.

29. *Sisters.*—Over one-half of all the hospitals pay an initial rate to Sisters of £70–75, and nearly one-third pay £80–85 (Table XIX.). Between the Complete Training Schools attached to Voluntary hospitals there is no great difference. The greater part of them, varying between two-thirds and four-fifths, pay £70–75 per annum. The Municipal hospitals

tend to pay rather more, over half of them offering £80–85. Fever hospitals and Tuberculosis sanatoriums are, in the main, on this higher scale, only about one-third paying £70–75.

30. *Summary of Rates of Pay.*—The rates paid by *all hospitals combined* (and it has been shown that considerable variation exists between the types) are summarised in Table XIXA.

31. In addition to these rates *uniform* and *laundry* are usually allowed, but the answers to the questions with regard to this (Nos. 22 and 23) were too indefinite to allow analysis.

32. *Salaries in Mental Hospitals.*—It will have been observed that Mental hospitals have not been included in these tables relating to salaries. These hospitals differ, as a whole, radically from the other groups in that a great number of them pay their staff a weekly wage from which is then deducted a charge for board and lodging (according in some cases to the scale of the Joint Conciliation Committee of the Mental Hospital's Association). The average figures seem to run from about £1 12*s.* per week for new untrained staff up to £2 10*s.* to £3 per week for the higher grades of trained staff, from which is deducted, usually, about £1 per week for board and lodging.

## Superannuation.

33. Two-thirds of these hospitals participate in superannuation schemes (Table XX.), in nearly all cases membership being compulsory (this, in practice, often only applies to trained staff and not to probationers). One-third have no pension scheme.

Of the 32 London Voluntary hospitals only two, or 6 per cent., do not participate in a scheme. The only other group of hospitals making provision to this extent is that for Mental patients. Amongst the Provincial Voluntary hospitals, the Associated hospitals approved for partial training, and the Tuberculosis hospitals, nearly one-half have no superannuation scheme, while the proportion is over one-third in the Children and Fever hospitals. Ten Municipal hospitals report that they are attached to no scheme.[9]

## Amenities.

34. *Facilities for Recreation.*—The provision of facilities for exercise and recreation cannot be very satisfactorily put into statistical form. Most hospitals supply such indoor amusements as are provided by the wireless, the gramophone, or the piano; many have libraries, and a few have gymnasiums, swimming baths, and hockey fields. The provision of one or two main categories is shown in Table XXI., but it should be remembered that one hospital may provide only one form of exercise, another may provide half a dozen or more. The variations are naturally too great to allow inclusive categories to be a possible method of presentation. Tennis is, obviously, the most usual form of recreation provided, three-quarters of the hospitals in every group, except the Tuberculosis hospitals, making provision for it. Amongst these tuberculosis hospitals a relatively low proportion have facilities for tennis, while a relatively high proportion tend to provide less strenuous games, such as croquet and clock golf—such games, presumably, as the patients can also join in. Scope for dancing is given in three-quarters of the Mental hospitals and in one-quarter to one-half of most of the other groups. A few hospitals stated that they had no facilities at all for recreation, the proportion being about 5 to 10 per cent., except in Children's hospitals, where it is as high as 16 per cent.

TABLE XX.

SUPERANNUATION.

*Question 21.*—Are you affiliated to a superanuation scheme? If so, is membership compulsory?

| Type of hospital. | Percentage that are affiliated to schemes membership of which is compulsory. | Percentage that are affiliated to schemes membership of which is not compulsory. | Percentage not affiliated to any scheme. | Total. |
|---|---|---|---|---|
| Hospitals approved as Complete Training Schools— | | | | |
| London Voluntary.. | 81% | 13% | 6% | 100% (32) |
| Provincial ,, .. | 54% | 3% | 43% | 100% (122) |
| London and Provincial Municipal .. | 68% | 20% | 12% | 100% (80) |
| Approved for Partial Training .. .. | 42% | 8% | 50% | 100% (78) |
| Hospitals approved for Special Training— | | | | |
| Children .. .. | 63% | — | 37% | 100% (19) |
| Fever .. .. | 52% | 12% | 36% | 100% (42) |
| Mental .. .. | 95% | — | 5% | 100% (75) |
| Hospitals not approved– Tuberculosis .. | 40% | 13% | 47% | 100% (60) |
| Total.. .. | 61% | 8% | 31% | 100% (508) |

35. *Common Rooms.*—Practically every hospital provides one or more common rooms for the staff (99 per cent. of the total) (Table XXI.).

36. *Men Guests.*—A half to three-quarters of these hospitals do not admit men guests at all, and only 10 per cent. admit them without the qualifications "by permission" or "on special occasions." The London Voluntary hospitals are the most liberal in this respect, over one-third stating, without qualifications, that men guests are admitted (Table XXI.).

37. *Smoking.*—The final section of Table XXI. shows that roughly three-quarters of all the hospitals answering this question do permit the staff to smoke in some part of the nurses' home. The proportion that forbids it is lowest amongst the Mental hospitals, of which only 7 per cent. do not allow it, and highest in the Municipal hospitals, of which 41 per cent. refuse permission. The Voluntary hospitals, London and Provincial, show equal proportions, a little over one-quarter of them not allowing smoking; in Children's hospitals and Fever hospitals the proportion rises to about one-third.

38. *Curfew.*—Classified under this heading of Amenities is the hour at which the nurse whose off-duty

[9] Some of the nurses employed in these hospitals—i.e., those transferred from poor-law hospitals—remain under the Poor-Law Officers' Superannuation Act of 1896 or the Local Government or other Officers' Superannuation Act of 1922. Nurses appointed to these ten hospitals since the transfer do not come under any scheme.

time happens to fall in the evening must return to hospital. Table XXII. shows the hour for all hospitals combined at which probationers must be back without a late pass (the hour may be later in some cases for staff nurses). The great majority of hospitals (80 per cent.) require probationers to be back at 10 o'clock. Very few (3 per cent.) allow a later hour than 10.30 P.M., very few require the probationer to return before 10 P.M.

39. *Latch-keys.*—The first line of Table XXII. shows that exceedingly few hospitals issue a latch-key to the senior nurses. Except in the case of the London Voluntary hospitals and the Tuberculosis hospitals the proportion is negligible. One-quarter of these two groups allow a latch-key or state that it is unnecessary, as entrance can be made at any hour without it.

## Meals.

40. Table XXIII. shows the amount of time allowed off for meals. In the case of breakfast and supper these meals are usually taken before and after duty, so that many hospitals did not state the duration of time allotted to them. The percentages shown for breakfast and supper relate only to those hospitals that did reply in regard to these meals.

41. *Breakfast.*—Nearly 90 per cent. of the hospitals allow half an hour for this meal. One-tenth only give 15–20 minutes.

42. *Early Lunch.*—A good deal of variation is to be seen in the time allotted to this meal, but actually some part of the time allowed may be occupied with the tidying of the nurse's own room or making her bed. About one-half of the hospitals allow 15–20 minutes, while 40 per cent. give half an hour. Comparison of the various groups (not given in this table) showed that the Municipal hospitals mainly allow the longer period; only 12 per cent. of them give 15–20 minutes as compared with, roughly, 60 per cent. amongst the London and Provincial Voluntary hospitals. Mental hospitals tend to give only the shorter period or no time at all.

43. *Dinner.*—Two-thirds of all the hospitals allow half an hour, one-quarter allow three-quarters of an hour (including a few who allow 40 minutes). Again it was found that more of the Municipal hospitals allow the longer period, while the majority of the Voluntary hospitals give the shorter period. A quarter of the Mental hospitals give a full hour, a considerably higher percentage than is to be found in any of the other groups, which probably is related to the absence in many cases of any time off for early lunch (see above).

44. *Tea and Supper.*—Half an hour is nearly always allotted to each of these meals, some of the Mental hospitals, which allow but 15–20 minutes, being practically the only exceptions.

Thus, as a whole, half an hour is allowed for each of the four main meals of the day.

TABLE XXI.—AMENITIES.

*Question 24.*—Have you any facilities for exercise and recreation?
*Question 25.*—Are common rooms provided?
*Question 26.*—Are men guests admitted?
*Question 27.*—Is smoking permitted in any part of the nurses' home?

| Amenities. | Approved as Complete Training Schools. | | | Approved for Partial Training. | Approved for Special Training. | | | Not approved as Training Schools. | All hospitals combined. |
|---|---|---|---|---|---|---|---|---|---|
| | London Voluntary. | Provincial Voluntary. | London and Provincial Municipal. | Affiliated, Associated and Reciprocal. | Children. | Fever. | Mental. | Tuberc. | |
| *Question 24.* | | | | | | | | | |
| Hospitals that provide tennis .. .. .. | 75% (32) | 85% (122) | 92% (60) | 75% (79) | 84% (19) | 84% (43) | 87% (75) | 61% (64) | 81% (494) |
| Hospitals that provide croquet and/or badminton, deck quoits, &c. .. | 38% | 17% | 28% | 16% | 37% | 26% | 31% | 39% | 26% |
| Hospitals that provide dancing .. .. .. | 41% | 36% | 47% | 24% | 32% | 30% | 72% | 23% | 39% |
| Hospitals that provide no facilities .. .. .. | 3% | 7% | 5% | 11% | 16% | 7% | 3% | 9% | 7% |
| *Question 25.* | | | | | | | | | |
| Number of hospitals that provide common-rooms.. | All (32) | 99% (121) | 98% (60) | All (78) | All (19) | All (43) | 97% (74) | 97% (60) | 99% (487) |
| *Question 26.* | | | | | | | | | |
| Number of hospitals that— | | | | | | | | | |
| (1) Admit men guests .. | 38% (32) | 4% (122) | 10% (60) | 5% (78) | 21% (19) | 12% (43) | 4% (74) | 13% (60) | 10% (488) |
| (2) Admit men guests on special occasions .. | 3% | 12% | 17% | 12% | 26% | 14% | 30% | 7% | 15% |
| (3) Admit men guests by permission .. .. | 6% | 7% | 3% | 4% | — | — | 3% | 12% | 5% |
| (4) Do not admit men guests .. .. .. | 53% | 77% | 70% | 79% | 53% | 74% | 63% | 68% | 70% |
| *Question 27.* | | | | | | | | | |
| Number of hospitals that do not allow smoking .. | 28% (32) | 28% (121) | 41% (59) | 13% (77) | 32% (19) | 38% (42) | 7% (74) | 23% (61) | 25% (485) |

45. *Compulsory Attendance at Meals.*—Table XXIV. shows that attendance at meals when adjacent to off-duty hours is compulsory in one-third of the hospitals, or if attendance at the main meals only (such as dinner) be included it is compulsory in nearly one-half. In 13 per cent. attendance is compulsory but leave of absence can be obtained. In nearly one-half attendance is not compulsory. It was found that three-quarters of the Mental hospitals do not make attendance compulsory; the proportion falls to the neighbourhood of 40 per cent. in the London Voluntary, Provincial Voluntary, Affiliated, Reciprocal, Fever and Tuberculosis hospitals, and to one-quarter in the Associated and in the Municipal hospitals. The Children's hospitals are strictest in this respect, only one-tenth making attendance optional.

TABLE XXII.—AMENITIES—(*continued*).

*Question 28.*—Have the senior nurses a latch-key?
*Question 29.*—What time must nurses be back without a late pass?

| Amenities. | Approved as Complete Training Schools. | | | Approved for Partial Training. | Approved for Special Training. | | | Not approved as Training Schools. | All hospitals combined. |
|---|---|---|---|---|---|---|---|---|---|
| | London Voluntary. | Provincial Voluntary. | London and Provincial Municipal. | Affiliated, Associated and Reciprocal. | Children. | Fever. | Mental. | Tuberc. | |
| Number of hospitals that provide senior nurses with a latchkey or state that it is not necessary .. | 25% (32) | None (122) | 2% (60) | 4% (78) | None (19) | 4% (43) | 9% (74) | 25% (69) | 7% (488) |

| | HOUR AT WHICH PROBATIONERS MUST BE BACK. | | | | |
|---|---|---|---|---|---|
| | 9 or 9.30 P.M. | 10 P.M. | 10.15 or 10.30 P.M. | 11 P.M. or later. | Total. |
| All hospitals combined .. | 4% .. | 80% .. | 13% .. | 3% .. | 100% (516) |

Day and Night Span.

46. *Day Span.*—The hours of duty can be regarded from various aspects. It is important not only to know the daily hours of work and the daily and weekly hours off-duty, but also to know the span of the working hours—i.e., the hours over which the nurse's daily work extends irrespective of the off-duty time that she has within those hours. The span of the duty hours by day is shown in Table XXV. and by night in Table XXVI. Taken as a whole (Table XXV.) in half the hospitals the working day extends over 12½ to 13¼ hours, while in about one-third it extends over 13½ to 13¾ hours. Only 7 per cent. prolong the extent of the day to 14 hours or more, only 5 per cent. reduce to 12¼ hours or less. Within the groups the most noticeable difference is between the Voluntary hospitals and the Municipal hospitals. In the former, London and Provincial hospitals and Children's hospitals, the larger proportion, approaching two-thirds, extend the day over the longer hours, 13½ to 14¼. Amongst the Municipal hospitals none makes the day extend over as long as 14 hours, and two-thirds place it at 13 to 13¼ hours. The groups approved for partial training and the Fever and Tuberculosis hospitals in large numbers keep the day within the 12¼–13¾ hours, though one-quarter to one-fifth of the Tuberculosis hospitals and of the groups approved for partial training require 13½ hours.

Inspection of the original figures from which the table was derived show that the day staff of nearly all hospitals, some 95 per cent., begin work between 7 and 7.30 A.M. None begins before 7 o'clock, only 5 per cent. begin as late as 8 o'clock. This is true of the majority of the various groups of hospitals, though somewhat larger proportions of the Associated, Fever and Tuberculosis hospitals tend to begin the day at the later hour.

At the other end of the day there is a visible difference in procedure between the large voluntary hospitals in London and the Provinces and the Municipal hospitals. This difference is that none of the Municipal hospitals works as late as 9 P.M., while one-quarter of the Provincial Voluntary hospitals and nearly one-third of the London Voluntary hospitals continue day duty till 9 to 9.30 P.M. Sixty per cent. of the Municipal hospitals begin day work at 7 to 7.30 A.M. and cease at 8 to 8.15 P.M., and the remainder cease at or before 8.45 P.M.

Taking the hospitals as a whole (no other distinct differences in procedure being apparent) it is seen that three-quarters of them place the hours of work between 7 to 7.30 A.M. and 8 and 8.45 P.M.

47. *Night Span* (Table XXVI.).—Three-quarters of the combined group of hospitals make the hours of duty extend over 11½ to 12¼ hours; nearly one-quarter have a shorter period, and only 8 per cent. extend it to 12½–13 hours. The Municipal hospitals do not differ distinctly from the Voluntary hospitals (especially those in the Provinces), though there is a tendency for the London Voluntary hospitals and the group for partial training to make the hours extend to 12. In Children's hospitals the hours over which duty extends are, as a whole, definitely fewer than in the other groups, while in the Fever hospitals just the reverse is seen, over half of them making the hours 12½–13.

Three-quarters of all the hospitals as a combined group require night nurses to begin duty between 8 and 8.45 P.M. Very few hospitals put the duty hour before 8 P.M., but one-fifth of them place it at 9 to 9.30. A difference in procedure between the London and Voluntary hospitals and the Municipal hospitals is naturally to be seen; as some quarter of the former tended to place the end of day duty at 9 to 9.30, so one-quarter put the beginning of the night duty at the same hour. The Municipal hospitals placed the end of the day shift earlier, and so the beginning of the night shift must be correspondingly early. In half of all the hospitals night

duty ceases between 8 and 9 A.M., in about one-quarter between 7.30 and 8.15 A.M., and in less than one-quarter at an earlier hour than this.

### Off-Duty Hours.

48. The off-duty hours, daily and weekly, are shown in Tables XXVII. and XXVIII., and the annual holidays in Table XXIX. In question 33 the off-duty time was also asked "fortnightly," and the replies to this as well as those relating to daily and weekly off-time have been used to calculate the average working week dealt with in the next section. Tables XXVII. and XXVIII. aim merely at showing the type of daily and weekly times off that hospitals

TABLE XXIII.

HOURS OFF FOR MEALS.

*Question 32.*—What are hours off for meals? Breakfast, early lunch, lunch, tea, supper.

| | All hospitals combined. |
|---|---|
| BREAKFAST— | |
| 15–20 minutes .. | 11% |
| ½ hour .. .. | 87% |
| ¾ „ .. .. | 2% |
| Total .. .. | 100% (393) |
| EARLY LUNCH— | |
| Nil .. .. .. | 10% |
| 15–20 minutes .. | 48% |
| ½ hour .. .. | 40% |
| ¾–1 „ .. .. | 2% |
| Total .. .. | 100% (482) |
| LUNCH— | |
| ½ hour .. .. | 66% |
| ¾ „ .. .. | 27% |
| 1 „ .. .. | 7% |
| Total .. .. | 100% (485) |
| TEA— | |
| 15–20 minutes .. | 2% |
| ½ hour .. .. | 96% |
| ¾ „ .. .. | 2% |
| Total .. .. | 100% (478) |
| SUPPER— | |
| 15–20 minutes .. | 2% |
| ½ hour .. .. | 96% |
| ¾–1 „ .. .. | 2% |
| Total .. .. | 100% (354) |

TABLE XXIV.

ATTENDANCE AT MEALS.

*Question 30.*—Is attendance at meals compulsory even when meal-times are adjacent to off-duty hours?

| | All hospitals combined. |
|---|---|
| Attendance compulsory. | 32% |
| Attendance compulsory at certain meals .. | 13% |
| Attendance compulsory, but leave of absence given .. .. .. | 13% |
| Attendance not compulsory .. .. .. | 42% |
| Total .. .. | 100% (486) |

TABLE XXV.

HOURS OF DUTY BY DAY, SPAN.

*Question 31.*—What are the duty hours of nurses? By day: by night.

| Type of hospital and number upon which percentages are based. | Span of day, in hours.* | | | | | |
|---|---|---|---|---|---|---|
| | 11½ | 12 and 12¼. | 12½ and 12¾. | 13 and 13¼. | 13½ and 13¾. | 14 and 14¼. |
| Hospitals Approved as Complete Training Schools— | | | | | | |
| London Voluntary (32) | — | 3% | 6% | 31% | 50% | 10% |
| Provincial „ (120) | 1% | 1% | 4% | 31% | 47% | 16% |
| London and Provincial Municipal .. (81) | — | — | 14% | 63% | 23% | — |
| Hospitals Approved for Partial Training .. (76) | — | 7% | 15% | 47% | 26% | 5% |
| Hospitals Approved for Special Training— | | | | | | |
| Children .. (19) | — | — | — | 42% | 53% | 5% |
| Fever .. .. (41) | — | 10% | 29% | 51% | 7% | 3% |
| Hospitals not Approved— | | | | | | |
| Tuberculosis .. (59) | 3% | 10% | 26% | 37% | 17% | 7% |
| Total .. (428) | 1% | 4% | 13% | 43% | 32% | 7% |

* These hours represent the span over which the day's work is spread—i.e., from time of coming on to duty to time at which duty ceases, and do not take into account the "hours off" during the day.

TABLE XXVI.

HOURS OF DUTY BY NIGHT, SPAN.

| Type of hospital and number upon which percentages are based. | Span of night, in hours. | | | | |
|---|---|---|---|---|---|
| | 10 and 10¼. | 11 and 11¼. | 11½ and 11¾. | 12 and 12¼. | 12½ and 13. |
| Hospitals Approved as Complete Training Schools— | | | | | |
| London Voluntary .. (32) | 6% | 16% | 25% | 47% | 6% |
| Provincial „ .. (121) | 4% | 23% | 37% | 33% | 3% |
| London and Provincial Municipal .. .. (54) | 2% | 28% | 35% | 35% | — |
| Hospitals Approved for Partial Training .. .. (75) | 1% | 11% | 23% | 60% | 5% |
| Hospitals Approved for Special Training— | | | | | |
| Children .. .. (19) | — | 26% | 53% | 21% | — |
| Fever .. .. .. (42) | — | 2% | 17% | 26% | 55% |
| Hospitals not Approved— | | | | | |
| Tuberculosis .. .. (55) | 2% | 22% | 25% | 51% | — |
| Total .. .. (398) | 2% | 19% | 30% | 41% | 8% |

afford, without taking into account the average hours worked in a day or week.

49. *Time off Daily.*—Table XXVII. shows that of the hospitals that give daily time off, two-thirds give two hours off daily, and one-quarter grant three hours. Very few give four hours. As noted in the footnote to the table a few give varying hours, two hours on some days three or four hours on other days; these have been grouped under the lowest time given, so that the daily time off is somewhat but not seriously understated. Between the London and Provincial Voluntary hospitals and the hospitals approved for partial training, there is not very much difference. In all these groups one-half give two hours off daily, and one-third of the hospitals give three hours off daily; on the other hand, amongst the Municipal hospitals hardly any give three hours, and nearly all give two hours. Amongst Children's hospitals half give three hours off-time daily, amongst the Fever and Tuberculosis hospitals only one-quarter do so.

TABLE XXVII.

OFF-DUTY TIMES.

*Question 33.*—Off-duty times and holidays: (*a*) daily; (*b*) fortnightly; (*c*) weekly; (*d*) yearly.

(*a*) DAILY.

| Type of hospital and number upon which percentages are based. | Hours off daily.† | | | |
|---|---|---|---|---|
| | 2. | 2½. | 3. | 4. |
| Hospitals approved as Complete Training Schools— | | | | |
| London Voluntary .. .. (32) | 56% | 3% | 38% | 3% |
| Provincial „ .. .. (120) | 49% | 13% | 35% | 3% |
| London and Provincial Municipal (76) | 92% | 4% | 4% | — |
| Hospitals approved for Partial Training (79) | 58% | 9% | 33% | — |
| Hospitals approved for Special Training— | | | | |
| Children .. .. .. .. (19) | 37% | 16% | 47% | — |
| Fever .. .. .. .. (40)* | 65% | — | 28% | 5% |
| Hospitals not approved— | | | | |
| Tuberculosis .. .. .. (56) | 66% | 7% | 25% | 2% |
| Total .. .. .. (422) | 62% | 8% | 28% | 2% |

† In a few cases varying hours off are given—e.g., 2 hours on three days, 3 hours on two days, 4 hours on Sunday. Such cases have been grouped under the lowest amount of time off allowed, so that the above example would have been grouped under 2 hours off daily. Many hospitals give more time off on Sunday, but few vary on the weekdays, so that although the table understates somewhat the hours off it does not appreciably understate them.

* One hospital allows three hours off every other day.

50. *Time off Weekly.*—Half the total hospitals (Table XXVIII.) give a half-day off per week, while nearly half give one whole day. The Voluntary hospitals, London and Provincial, and those for partial training again resemble one another and again differ from the Municipal hospitals. Of the latter over three-quarters grant the whole day per week, a proportion twice as high as that to be observed amongst the London and Provincial Voluntary hospitals and the hospitals approved for partial training. No other differences between the various groups need be stressed.

51. *Time off Annually.*—One-quarter of the combined hospitals (Table XXIX.) give their probationers 2 to 2½ weeks' holiday in the year, two-thirds give 3 weeks, and the remaining 8 per cent. give 4 weeks. Within the groups the London Voluntary and the Reciprocal hospitals are especially noticeable, as many as one-quarter of them giving 4 weeks' holiday and only 16 per cent. giving as little as 2–2½ weeks. Most of the Provincial Voluntary hospitals, the Municipal hospitals, and the Children's and Tuberculosis hospitals give 3 weeks, while, on the other hand, roughly half of the Affiliated, Associated, and Mental hospitals and nearly half of the Fever hospitals give only 2–2½ weeks.

TABLE XXVIII.—OFF-DUTY TIMES.

(*c*) WEEKLY.

| Type of hospital and number upon which percentages are based. | Time off weekly. | | |
|---|---|---|---|
| | ½ day. | 1 day. | 2 half-days or 1 day and ½ day alternately or 1½ days or 2½ days. |
| Hospitals approved as Complete Training Schools— | | | |
| London Voluntary .. .. (23) | 57% | 39% | 4% |
| Provincial „ .. .. (97) | 57% | 42% | 1% |
| London and Provincial Municipal (85) | 18% | 79% | 3% |
| Hospitals approved for Partial Training (68) | 68% | 32% | — |
| Hospitals approved for Special Training— | | | |
| Children .. .. .. .. (16) | 56% | 38% | 6% |
| Fever .. .. .. .. (39) | 59% | 36% | 5% |
| Hospitals not approved— | | | |
| Tuberculosis .. .. .. (58) | 67% | 14% | 19% |
| Total .. .. .. (386) | 52% | 43% | 5% |

## Duty Hours.

52. *Hours of Work.*—Relating the hours of duty (span) to the off-duty times, the actual hours of work have been calculated and are set out in Table XXX.: (1) the *daily hours* worked—i.e., the span less time off for meals and less daily time off-duty; (2) the *average weekly hours* of work, taking into account all the off-duty time (hours, whole days, and half days) given during four weeks and all the time off for meals within the span (usually 1½ hours a day).

53. *Daily Hours.*—In nearly two-thirds of all the hospitals the daily hours of work lie between 9 and 10; in one-quarter these hours are extended to 10 to 11, and in the remainder

(14 per cent. of the total) only 8 to 9 hours are worked per day. Between the various categories of hospitals certain distinct differences in procedure are obvious. Amongst the Voluntary hospitals, both in London and in the Provinces, a large proportion, between one-third and one-half, work the longer 10–11 hour day. On the other hand very few of the Municipal hospitals work to this schedule and three-quarters of them require, instead, the 9–10 hours' day. In all the other groups of hospitals the majority (one-half to two-thirds) require 9–10 hours to be worked, but in quite an appreciable proportion, one-sixth to one-quarter the longer period of work of 10–11 hours is the rule. Amongst the hospitals approved for partial training and the Fever hospitals quite a large number (about one-fifth) carry out the work on the 8–9 hour basis.

54. *Average Weekly Hours.*—These hours are converted to an average weekly basis for day duty, allowing for all off-duty time in four weeks. It should be observed that this average week understates the *usual* working week, inasmuch as the day or days off in four weeks are spread over. Bearing this in mind, it appears that of all the hospitals exactly half have an average working week of 55–59 hours. None works less than 50 hours, though 15 per cent. exact only 50–54 hours. At the other extreme 7 per cent. require a working week of 65–69 hours, and in one-quarter the average week amounts to 60–64 hours. Comparing the various types of hospitals, noticeable differences are that none of the Municipal hospitals works the 65–69 hour week and only a small number the 60–64 hour week. Three-quarters of them carry out the work in a week of 55–59 hours. On the other hand, amongst the Voluntary hospitals, one-quarter of those in London and one-half of those in the Provinces require a working week of over 60 hours. Of the other groups of hospitals the proportions working the shorter week of between 50 and 59 hours vary between one-half and three-quarters, while one-quarter to one-half have the longer week of 60–69 hours. Again a very distinct feature is the considerable variation of procedure shown between hospitals of the same type. For instance, 14 per cent. of the hospitals approved for partial training require an average week of only 50–54 hours; nearly half make the week 55–59 hours; one-third extend it to 60–64 hours; and one-tenth apparently require a week of 65–69 hours. There is no uniformity within the group. It must be remembered that this is the *average* working week taking into account time off fortnightly and monthly. The weeks in which this time off does not fall will be several hours longer than the average week, the weeks in which the fortnightly or monthly free time falls

TABLE XXIX.—OFF-DUTY TIMES.

(*d*) YEARLY.

| | | Yearly holiday in weeks.* | | |
|---|---|---|---|---|
| | | 2–2½. | 3. | 4. |
| All hospitals combined .. .. .. | (516) | 28% | 64% | 8% |

* These relate to probationers; trained staff in many cases get longer holidays.

TABLE XXX.

Daily hours* actually worked—i.e., span less free time and meal times—on normal days.
Average weekly hours worked—i.e., total hours per 4 weeks, less all free time and meal times divided by four.
[*Questions 31 correlated with Questions 32 and 33.*]

| | Approved as Complete Training Schools. | | | Approved for Partial Training. | Approved for Special Training. | | Not approved as Training Schools. | All hospitals combined. |
|---|---|---|---|---|---|---|---|---|
| | London Voluntary. | Provincial Voluntary. | London and Provincial Municipal. | Affiliated, Associated and Reciprocal. | Children. | Fever. | Tuberc. | |
| DAILY HOURS. | | | | | | | | |
| Number of hospitals on which percentages are based .. | 27 | 101 | 52 | 72 | 19 | 43 | 58 | 372 |
| Percentage working— | | | | | | | | |
| 8–9 hours .. .. | 15% | 7% | 15% | 17% | 5% | 21% | 17% | 14% |
| 9–10 „ .. .. | 48% | 49% | 77% | 64% | 69% | 63% | 62% | 60% |
| 10–11 „ .. .. | 37% | 44% | 8% | 19% | 26% | 16% | 21% | 26% |
| Total .. .. | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| AVERAGE WEEKLY HOURS. | | | | | | | | |
| Number of hospitals on which percentages are based .. | 28 | 88 | 53 | 66 | 16 | 42 | 53 | 346 |
| Percentage working— | | | | | | | | |
| 50–54 hours .. .. | 7% | 8% | 17% | 14% | 13% | 24% | 24% | 15% |
| 55–59 „ .. .. | 68% | 39% | 72% | 44% | 56% | 52% | 42% | 50% |
| 60–64 „ .. .. | 14% | 44% | 11% | 32% | 25% | 19% | 30% | 28% |
| 65–69 „ .. .. | 11% | 9% | — | 10% | 6% | 5% | 4% | 7% |
| Total .. .. | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |

* Hours on night duty would work out considerably longer because the nurse is not allowed free time during the span, and is not always relieved for meals (see Table XXXIV). The information supplied was not sufficiently detailed to enable a table for net hours of night duty to be compiled.

due will be shorter than the average.

55. *Hours of Work at Mental Hospitals.*—It will be noticed that the Mental hospitals have not been included in most of the tables relating to hours of work and off-duty times. As with salaries paid, so with hours worked and free time given, they differ completely, in most cases, from all the other types of hospitals. In large numbers of them no daily off-time is given at all (beyond that for meals), so that very long hours are worked; in half of those here dealt with the daily hours lay between 11 and 12¼, but these hours are worked only for five days in the week, two complete days, or at least one and a half days, being given as free time. On the other hand, amongst these Mental hospitals there is a number, made up mainly of hospitals in the Municipal service, in which the 24 hours are divided into three shifts, so that relatively short hours are worked, the result being that in about one-fifth of all the Mental hospitals dealt with the working day was only of 7 or 8 hours' duration. This shift is worked—e.g., 7 A.M. to 2 P.M., or 1.30 P.M. to 9 P.M.—with no break except for a meal (and this may be taken on duty), but the rest of the day the nurse has free. In these hospitals one long day—e.g., nine hours—is worked weekly, and the average weekly hours total 48—less than in any of the other types of hospitals—while amongst the Mental hospitals with long daily hours worked for five days per week, the weekly average lies usually between 55 and 60 hours. Thus in the week they work, as a whole, a shorter period than the other types of hospitals, though in the day they work either considerably longer hours or shorter but more intensive hours without any appreciable break during the span of work.

TABLE XXXI.

NOTICE IN ADVANCE OF OFF-DUTY TIME.

*Question 34.*—Notice in advance of off-duty times and holidays: (*a*) hours off; (*b*) day off; (*c*) annual holiday.

(*a*) HOURS OFF.

| Type of hospital and number upon which percentages are based. | Notice given. | | | | |
|---|---|---|---|---|---|
| | Morning of the same day. | Previous day. | Beginning of the week. | Fixed schedule. | "As asked for." |
| Hospitals approved as Complete Training Schools— | | | | | |
| London Voluntary .. (30) | 37% | 7% | 26% | 30% | — |
| Provincial „ .. (118) | 64% | 2% | 16% | 17% | 1% |
| London and Provincial Municipal .. .. (59) | 68% | — | 20% | 12% | — |
| Hospitals approved for Partial Training .. (73) | 57% | 1% | 22% | 19% | 1% |
| Hospitals approved for Special Training— | | | | | |
| Children .. .. .. (19) | 36% | 11% | 27% | 26% | — |
| Fever .. .. .. (37) | 32% | 22% | 35% | 8% | 3% |
| Hospitals not approved— | | | | | |
| Tuberculosis .. .. (55) | 44% | 4% | 29% | 16% | 7% |
| Total .. .. (391) | 54% | 4% | 23% | 17% | 2% |

TABLE XXXII.—NOTICE IN ADVANCE OF OFF-DUTY TIME.

*Question 34*—continued.

(*b*) DAY OFF.

| All hospitals combined (450). | Notice given. | | | | |
|---|---|---|---|---|---|
| | Beginning of week or end of previous week. | Fixed schedule. | At least 2–3 days. | Previous day. | "As asked for." |
| | 55% | 30% | 6% | 6% | 3% |

(*c*) ANNUAL HOLIDAY.

| All hospitals combined (430). | Notice given. | | | | | |
|---|---|---|---|---|---|---|
| | At least 1 month. | At least 2–3 weeks. | In January or February. | In March, April, or May. | At least 2–3 months. | By arrangement or priority. |
| | 41% | 15% | 7% | 13% | 14% | 10% |

## Notice in Advance of Off-Duty Time.

56. For the nursing staff to be able to take full advantage of their free hours adequate notice in advance as to when they will be off duty is obviously essential. The next two tables (XXXI. and XXXII.) show the notice that is given by these hospitals in advance of the daily hours off, of the weekly day or half-day off, and of the annual holiday.

57. *Notice of Hours Off.*—Of all the hospitals combined half of them notify the nurse of her daily hours off on the morning of the same day (Table XXXI.), one-quarter have a weekly list, so that the nurse knows at the beginning of the week, while nearly one-fifth work to a "fixed schedule," which probably implies still longer notice—for example, a monthly or even a three-monthly list. Within the groups of hospitals there is appreciable variation. The proportion that give notice only on the morning of the same day is relatively low amongst the London Voluntary, Children and Fever hospitals (about one-third) and relatively high amongst the Provincial hospitals, voluntary and municipal, and the hospitals approved for partial training (nearly two-thirds). Over half of the London Voluntary hospitals and Children's hospitals give notice at the beginning of the week or by a fixed schedule, while the proportion of the Provincial Voluntary and Municipal hospitals doing so is only one-third.

58. *Notice of Day Off.*—Half the hospitals (Table XXXII.) give notice of the nurses' day off at the beginning of the week or at the end of the previous week; one-third work to a "fixed schedule." Six per cent. give notice only on the previous day.

59. *Notice of Annual Holiday.*—Nearly half the hospitals state that they give *at least* one month's notice of the annual holiday times (for many of the staff the notice may, of course, appreciably exceed this). At one extreme 15 per cent. reply "at least two or three weeks," at the other extreme 14 per cent. reply "at least two to three months." The difficulty of interpreting replies such as "in January or February" and in "March ,April or May" makes adequate comparison of the procedure of the various groups impossible.

## Night Duty.

60. *Stretch of Night Duty.*—Over three-quarters of the hospitals make the stretch of night duty a period of three months (Table XXXIII.). Only 9 per cent. favour a longer period, while 13 per cent. make the length of duty only two months.

61. *Nights off Duty.*—In the number of nights off duty during night work (Table XXXIII.), about one-quarter of the hospitals as a whole allow two nights off duty per month, somewhat over one-third allow four nights per month, and about one-fifth allow from five to eight nights per month. The allowances do not differ materially between the types of staff, sisters, nurses and probationers.

62. *Relief of Night Nurses.*—In approximately half of these hospitals (Table XXXIV.) the night nurse is relieved during the night, and has a period away from the wards. In nearly half she is on duty throughout the night (in some of these cases it is reported that they "relieve one another"). The differences between the several groups of hospitals approved for Complete Training Schools and for partial training are not very large and do not differ appreciably from the average figures mentioned above. On the other hand, the other four groups of hospitals do vary considerably from this average procedure in that a much larger proportion (over three-quarters) of the Children and Mental hospitals make arrangements for the night nurse to be relieved, while a very small proportion (less than one-fifth) of the Fever hospitals and Tuberculosis hospitals arrange for any relief.

TABLE XXXIII.

NIGHT DUTY.

*Question 35.*—Night duty: (*a*) stretch of night duty; (*b*) nights per month off duty for night sister, staff nurse, probationer; (*c*) are night nurses relieved at night for meals?

(*a*) STRETCH OF NIGHT DUTY.

| | Months. | | | |
|---|---|---|---|---|
| All hospitals combined (460) .. | 2. | 3. | 4. | 5–6. |
| | 13% | 78% | 6% | 3% |

(*b*) NIGHTS PER MONTH OFF DUTY.*

| All hospitals combined. | Nights. | | | | |
|---|---|---|---|---|---|
| | 1. | 2. | 3. | 4. | 5–8. |
| Sisters .. .. .. (441) | 1% | 23% | 18% | 37% | 21% |
| Staff nurses .. .. (393) | 7% | 24% | 12% | 40% | 17% |
| Probationers .. .. (467) | 11% | 28% | 8% | 38% | 15% |

* In addition to these nights off per month the staff come late to duty on some evenings.

TABLE XXXIV.—NIGHT DUTY.

*Question 35*—continued.

(*c*) RELIEF OF NIGHT NURSES.

| Type of hospital and number on which percentages are based. | Number of hospitals in which nurses— | |
|---|---|---|
| | Are relieved at night. | Are not relieved at night. |
| Hospitals approved as Complete Training Schools— | | |
| London Voluntary .. .. (31) | 58% | 42% |
| Provincial „ .. .. (121) | 64% | 36% |
| London and Provincial Municipal (86) | 64% | 36% |
| Hospitals approved for Partial Training (77) | 48% | 52% |
| Hospitals approved for Special Training— | | |
| Children .. .. .. .. (19) | 79% | 21% |
| Fever .. .. .. .. (43) | 19% | 81% |
| Mental .. .. .. .. (75) | 77% | 23% |
| Hospitals not approved— | | |
| Tuberculosis .. .. .. (52) | 13% | 87% |
| All Hospitals combined .. .. (504) | 55% | 45% |

## Lectures.

63. *Time of Day.*—The final question on the questionnaire related to the time of day at which lectures take place, and whether they are given in duty or in off-duty hours. The time of day at which they take place is shown in Table XXXV. The figures, for all hospitals combined show that lectures are given in the morning and evening with about equal frequency, while afternoon lectures are somewhat less frequent (they number about three-quarters of those given in the morning or evening.

The latest hour for lectures is stated to be 9 to 9.15 P.M.

64. *Lectures in Off-duty Time.*—In one-quarter of the hospitals (Table XXXV.) most or all lectures are given in off-duty time, in one-quarter most or all are given during duty hours, and in about half the hospitals half the lectures come in duty time and half in off-duty time.

## Summary of Preceding Evidence.

65. So much variation has been shown to exist in the previous tables, between the 12 groups of hospitals dealt with, and often, as well, between the hospitals within each group, that an adequate summary is, perhaps, impossible. It must inevitably ignore all but the most outstanding differences between the groups of hospitals and confine attention merely to the average or modal (i.e., most usual) conditions of service. This is the procedure that I have followed and, remembering the limitations of the summary which takes no, or little, account of extremes, it must only be regarded as a very broad picture of some of the features of the average life offered to the would-be probationer. It relates only to the material conditions of the nurses' life. *This summary also relates nearly entirely to hospitals approved as training schools and gives very little account of the life and prospects in the non-approved hospitals.*

66. The candidate for nursing must be 18 or 19 years of age before she submits her application, though she may be accepted at 17 if she is willing to enter a hospital that is unable to give her a complete theoretical and practical training. She should have had, if she wishes to enter the Voluntary hospital service, an education at a secondary school, and possession of the Matriculation or School-leaving certificate will assist her to gain an entry into one of the larger training schools. On the other hand, in the absence of a secondary education, she will have no difficulty in gaining admission to a Municipal or Mental hospital if her educational level is that of the seventh standard at an elementary school. Having secured admission to a hospital approved for training she will usually find herself provided with a separate bedroom; but in any hospital in which an approved course of training is not given it is probable that she must be content to share her room. She must, if she wishes to be fully qualified, undergo a three to four years' course of training and, concurrently with her ward work, must attend lectures, in the morning, afternoon, or evening, half of which she must attend in her off-duty time. Rarely will she be required to pay any fee for her training, and she will not, as a rule, be asked to bind herself to work for any further period after qualification in the hospital which has afforded her her training. During her tuition she will be in receipt of a salary, ranging from £20 to £30 per annum in her first year to £30 to £40 in her final year. In addition she will be provided with her board and lodging, her uniform, and her laundry. When she becomes a Staff Nurse her initial salary will be £50 to £65 per annum, and should she become a Sister her salary will rise to between £70 to £85 and continue to increase by annual increments to, perhaps, £100 per annum. In two-thirds of the hospitals to which she may go after qualification she will be able to contribute to a superannuation scheme, and thus make some provision for her future.

67. Her life will be an institutional one, and during her training at any rate she must, when she is allowed out, return to the nurses' home by 10 P.M., unless she has special permission to be later. After qualification her hour of return may in some hospitals be a later one, but her hours will be fixed, and she will not be provided with a latch-key. Within the nurses' home she will have a common room at her disposal, but, as a rule, she will not be allowed to introduce men guests. Facilities for indoor and outdoor recreation will be given her (especially tennis), and she will usually be permitted to smoke in some part of the nurses' home. In return she will work from nine to ten hours per day from between 7 to 7.30 in the morning to 8 to 8.30 at night. During this day she will have half an hour off-duty for her lunch and her tea and, probably, a quarter of an hour to a half-hour for an early lunch, while she will have a further two–three hours of free time daily. Weekly she will be allowed half a day or a whole day off, and she will usually be allowed some extra time off fortnightly or monthly. As a result her *average* working week on day duty will be between 55 and 64 hours. Annually she will be given (as a probationer) two to three weeks' holiday.

68. With regard to making plans for the use of her off time, she may have as little as a month's notice of this annual holiday; her half-day or day off weekly she will know at the beginning of the week, or, less frequently, at the beginning of the month; her daily hours off she will know often only at the beginning of the same day.

TABLE XXXV.

LECTURES.

*Question 36.*—Lectures: Time of day? In off-duty? In duty time?

| All hospitals combined. | Number of hospitals* that have lectures in the— | | | Latest hour at which lectures take place. | Number of hospitals that have lectures— | | |
|---|---|---|---|---|---|---|---|
| | Morning (up to noon). | Afternoon (noon to 6 P.M.). | Evening (6 P.M. onwards). | | Mostly or all in off-duty time. | Mostly or all in on-duty time. | Half-and-half. |
| | 268 | 188 | 262 | 9.15 P.M. | 23% | 29% | 48% |

* Hospitals may report that they have lectures in morning, afternoon, and evening, in which case they have been entered three times, once under each category.

69. When she is on night duty her hours will be from 8 to 9 o'clock at night to 7.30 to 9 o'clock the next morning. Sometimes during this time she will be relieved and be given some free time away from the ward, but in an equal number of hospitals she will have to attend to her duties throughout the night. She will be on night duty for three months at a time, and during this period will be allowed two to four nights off per month in addition to coming to duty later on occasional evenings.

## Summary of Opinions on the Shortage of Candidates.

*Question 12.*—"Please state briefly what you believe to be the reasons for any shortage of Staff Nurses and Probationers, and suggest measures which might relieve it."

70. In the preceding section some idea has been given of the usual conditions of service which the prospective nurse is offered. Tables IV. and V. show clearly that these conditions are not sufficiently attractive, either absolutely or relatively, to alternative careers open to women, to draw sufficient numbers of applicants to the hospitals. At least half of these hospitals do not get satisfactory replies to their advertisements for staff nurses and probationers, while over one-third have found it necessary to use some "temporary nurses." The reason for this shortage most often put forward in the answers to

question 12 is the obvious one of the much wider sphere of women's work to-day. Many other occupations, it is said, offer better salaries and better prospects, with more freedom, more social amenities, and without the restrictions and long hours of institutional life. On the solution of these difficulties there is no agreement. Some consider that the discipline is not severe enough; some advocate "living out," while others say that it would be "fatal to the profession." Superannuation schemes are advocated by some that have not already adopted them; others favour the reduction of "menial work," and that off-duty hours should be so fixed that the nurse should be able to make social engagements and be reasonably sure of being able to keep them. In addition, it is said, the off-duty hours should not be taken up by lectures. On the other hand, some authorities believe that girls would not object to long hours and low salaries if their prospects *after* qualification were appreciably better than they are at present. Some state that they find no shortage since they lowered the hours and raised the salaries; others making the same changes report no improvement, or that increased pay only attracts the wrong type of girl.

71. A number of the non-approved hospitals, both general and special, attribute their difficulties to the fact that the training gained in them counts for nothing when entering an approved training school; that therefore the probationers, and specially the better class of girls, are naturally attracted to the large training schools. There should be, in the opinion of the authorities of this type of hospital, coöperation with the special and cottage hospitals for preliminary training. For instance, it is suggested that more coöperation is required between hospitals for children and the general training schools; the probationer qualified in the latter should come to the former for a fourth year and secure an additional qualification. Facilities, it is held, should be given for all forms of specialised training and for the means of securing such further qualifications.

72. Not many of those questioned believe in any lowering of the present educational standards demanded, and in fact some are of the opinion that the standard should be raised. On the other hand, the opinion is not infrequently expressed that the theoretical training demanded is too severe, not only on the grounds that a theoretically inefficient girl may make a good practical nurse, but more especially with regard to the difficulties and disadvantages of combining ward work and theoretical work. The combination, it is thought, may make the life of the probationer too arduous, and to obviate this latter difficulty preliminary training schools for some months before entering the wards are proposed; in these the theoretical aspects of hygiene, anatomy, and physiology might be taught. Such preliminary training schools, it is believed, would have the additional advantage of overcoming a problem continually put forward—viz., the gap between school-leaving age and the age at which the hospitals wish to recruit their staff. At present, it is said, girls leave school at 16 to 17 years of age, and, unwilling or unable to wait till they are 18 or 19 years of age and can enter the hospital service, find employment in other occupations which will accept them immediately after they complete their school career. As a solution of this difficulty it is suggested that the educational authorities might coöperate with the hospitals in the provision of schools for this preliminary training in the theory of the General Nursing Council's syllabus. At present, some authorities state, lectures and classes are held when the probationer is too tired to take advantage of them. Alternatively it is suggested that recruitment at an earlier age to Children's hospitals might be possible.

73. After training some of the difficulty is attributed to the fact that the staff nurse regards her position as merely a stepping-stone and immediately seeks a sister's post. "No good nurse," reports one, "wants to remain a staff nurse any more than a doctor wants to remain a house surgeon." She is said to be unlikely to seek work in a small cottage hospital in which promotion is slow and whose certificate of efficiency is not recognised as a qualification. Some signatories deplore this desire for speedy promotion and believe that a year as staff nurse should be insisted upon; bound up with this is the opinion often given that, relative to the probationers, the trained staff are underpaid and that their status should be radically revised. This could be carried out, it is stated, not only by raising the salaries of the trained staff but by regarding the untrained staff as students and charging them for tuition, instead of, as at present, regarding them as workers and paying them for their services. One suggestion of some interest is that the staff nurses should be afforded opportunity for taking more responsibilities; for instance, by representation on the Committee of Management or by promotion to the post of Junior Sister.

74. The attractions of private nursing, of the public health services, of special branches of nursing, and of nurses' coöperations, all, it is said, giving better pay, are cited as contributing causes to the lack of trained staff in the hospitals. On the other hand, some of the special hospitals find that nurses are disinclined to take up their specialised forms of nursing without such extra pay. The nursing of mental patients is by some labelled "monotonous and unpleasant," while parents are said to object to their daughters undertaking work amongst the tuberculous. Individual hospitals endeavour to overcome these difficulties in various ways. For instance, one sanatorium reports that they employ ex-patients, "at first on half time and half pay, gradually working up to full time under medical supervision." A Fever hospital states that it is "experimenting with girls of 16 as 'ward orderlies' who do domestic work and assist with convalescent patients," until they are of an age to begin training.

75. Finally, in the opinion of an appreciable number of hospital authorities, the shortage of candidates is due only to the fact that the profession is judged by the conditions of the past and not by those of the present. They believe that an "erroneous idea of overwork, underfeeding, and underpay" exists, and that "exaggerated reports of treatment by seniors" remain in the minds of possible candidates and their parents. It is believed that these opinions could be corrected by suitable propaganda in schools and in the Press.

## Conclusion.

76. This summary of opinions shows that there is hardly a factor analysed in the preceding tables relating to conditions of service, which has not been been referred to, in one way or another, as bearing either upon the shortage of applicants for training or upon the shortage of qualified nurses. As pointed out in the Introduction, it has not been the aim of this Report either to prove or to refute these beliefs, but rather to show exactly what *are* these conditions which, in varying ways, the hospital authorities themselves regard as contributing to an undoubtedly serious shortage both of trained and untrained staff

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